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# Wind Energy Guideline

Technical  
Supplement for  
Landscape  
Character and  
Visual Impact  
Assessment

November 2024





# Acknowledgement of Country

The Department of Planning, Housing and Infrastructure acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land, and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Wind Energy Guideline – Technical Supplement for Landscape Character and Visual Impact Assessment

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# Glossary of terms

Term	Definition
<b>Applicant</b>	A person seeking consent for a development or modification application for a State significant development project under the <i>Environmental Planning and Assessment Act 1979</i> , or any person who seeks to carry out the development
<b>Dwelling</b>	A room or suite of rooms occupied or used as a separate domicile as well as a building that meets the criteria outlined in section 1.3
<b>Landscape</b>	A holistic area comprising its various parts, including landform, vegetation, buildings, villages, towns, cities and infrastructure
<b>Magnitude</b>	The apparent size of a wind energy project in the landscape or when viewed from a given viewpoint
<b>Neighbour agreement</b>	An agreement negotiated between an applicant and the owner of land surrounding the project area (referred to as 'adjacent land') to manage the impacts from a development (including any exceedances of relevant assessment criteria)
<b>Private agreement</b>	An agreement between an applicant and a landholder to host a renewable energy project and/or manage the impacts from a development (including any exceedances of relevant assessment criteria)
<b>Private receiver</b>	A privately owned or used viewpoint type identified in Table 2
<b>Protected area</b>	Lands reserved or otherwise protected for conserving biodiversity or Aboriginal cultural heritage – this includes lands reserved under the <i>National Parks and Wildlife Act 1974</i> , flora reserves under the <i>Forestry Act 2012</i> , declared wilderness under the <i>Wilderness Act 1987</i> , Indigenous protected areas, world heritage areas and Ramsar wetlands
<b>Public viewpoint</b>	A publicly owned or used viewpoint type identified in Table 2
<b>Rural dwelling</b>	A dwelling within a rural zoned area (RU1, RU2, RU3, RU4 and RU6), large lot residential zoned area (R5), or environmental or conservation area zone (C2, C3 and C4)

Term	Definition
<b>Sensitive receivers</b>	Viewpoints that are more sensitive to change than others, including dwellings, historic homesteads, tourist accommodation, places of worship, town centres and central business districts
<b>Sensitivity</b>	A measure of the capacity of an element of the landscape to absorb the impacts from a proposed land use change and/or built form
<b>Swept area</b>	The area through which the blades of a wind turbine spin
<b>View</b>	The sight of a landscape or scene
<b>Visual impact</b>	The impact on views from private and public places, which is determined by considering the visual magnitude and sensitivity
<b>Wind energy development</b>	Works, infrastructure and buildings for generating electricity using wind turbines



# 1

## Introduction





This technical supplement provides additional guidance for applicants, consent authorities and the community using the Wind Energy Guideline to understand the process and requirements for assessing visual and landscape character impacts of wind energy development in NSW.

## 1.1 Purpose

This technical supplement provides a detailed description of the landscape character and visual impact assessment process.

It ensures that all applications for wind energy development include an assessment that is proportionate to the scale and impacts of the development, is easy to understand and considers the community views and values of the surrounding landscape.

The technical supplement identifies information that a landscape character and visual impact assessment must provide and includes assessment tools and requirements that applicants must use to produce consistent and comparable results.

The technical supplement also aims to:

- encourage good site selection, layout and design of wind energy projects early in the planning process
- guide the relevant identification, mitigation and management of significant impacts on the surrounding landscape and viewpoints from private and public places
- recognise that changes to our landscapes will be necessary to facilitate the transition to renewable energy and balance the need for this change with the need to protect unique and high-quality landscapes
- strengthen the landscape and visual impact assessment process to ensure consistent decision-making and reduce delays in the assessment process
- facilitate appropriate development of the wind industry in NSW.

## 1.2 General requirements

Applicants must prepare a detailed landscape and visual impact assessment as part of an environmental impact statement. The assessment must include a full description of the proposed



wind energy project and use maps to show the location of the project in relation to public viewpoints, private receivers and surrounding landscapes that require analysis.

It must include details of:

- the height of wind turbines
- roads and access tracks
- ancillary infrastructure, including batteries, fencing, substations and electricity distribution lines.

Tools and reference information to help the assessment process include:

- the most recent and highest resolution satellite imagery, aerial photography and available orthophotos at a scale of 1:25,000 (applicants should also provide the date the imagery was captured)
- topographic mapping, zoning and other land use information available on the NSW Planning Portal or [SEED](#)
- Google Earth or a similar mapping service and the most recent vegetation mapping, particularly vegetation information that gives an idea of the structure and height of vegetative cover.

Applicants must engage with the community, including the Indigenous community, as early as possible and throughout the assessment, to inform outcomes and any measures to mitigate impacts.

Importantly, the assessment process should happen alongside the design and siting of a wind energy project so that the community's input can effectively inform the design.

Field visits must inform the assessment to establish and ground truth important inputs into the process, including the scenic quality and sensitivity of the area. These site visits can include private property (with permission) or public areas surrounding the project footprint.

## Professional assessment skills

Professional assessment skills are critical to an effective landscape character and visual impact assessment. Applicants must engage relevant professionals (for example, landscape architects, architects, environmental planners, geographers or other visual assessment specialists) with demonstrated experience and capabilities. Experts should follow the guidance in this document to perform an effective and consistent assessment for wind energy development.

## 1.3 Approach to assessment

The technical supplement differentiates between:

- landscape character impact assessment (the assessment of the potential impact on an area's cumulative built, natural and cultural character or sense of place), and

- visual impact (the assessment of the potential impact on views).

The two assessments should be clear and discrete, as the design response and mitigation measures to address landscape character impact will likely be different from those for visual impact.

Applicants should consult on landscape and visual impacts as part of their broader environmental assessment process.

## Landscape character assessment

This process determines the overall impact of a project on an area's character and sense of place, including what people think and feel about the area and how society values it.

## Visual impact assessment

This process determines the day-to-day visual effects of a project on people's views from the private and public domain.

The likely impacts of a wind energy development can only be determined by understanding the sensitivity of an area or view to change and the magnitude of a proposed development in that area or view.

This technical supplement recognises that visual amenity should be afforded some protections and provides a range of tools to do so. However, it also recognises the fundamental principle that landowners have no proprietary right to or ownership of a view,<sup>1</sup> and a visible wind turbine or ancillary infrastructure does not necessarily constitute a visual impact.

Changes to our rural and natural landscapes will be necessary to facilitate a transition to renewable energy and to support the development of the wind energy industry. This technical supplement aims to achieve balanced outcomes that avoid and manage significant landscape and visual impacts while supporting this change.

## Sensitivity

Sensitivity is a measure of the capacity of a landscape or view to absorb the impacts from the proposed change. For example, a pristine natural environment is likely to be more sensitive than an industrial area. A view from a residence is also likely to be more sensitive than from a local road where views are more intermittent and less frequent.

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<sup>1</sup> Tenacity Consulting v Warringah Council (2004) NSWLEC 140 and Victoria Park Racing & Recreation Grounds Co Ltd v Taylor [1937] HCA 45.

## Magnitude

Magnitude refers to the physical scale of the wind energy development. A range of factors influence magnitude, including:

- the apparent size of a wind energy development decreases significantly as the distance from the viewer increases
- the apparent size of a wind energy development increases with the physical scale and dimensions of a wind turbine and the number of turbines that would be visible, although these factors are less discernible as distance from the viewer increases.

## Private receivers

The visual impact assessment must assess the potential impacts on private receivers, including private recreation areas and sporting fields, dwellings, and tourist and visitor accommodation.

For the purpose of this document, a dwelling has the same meaning as the Standard Instrument - Local Environmental Plan which is a room or suite of rooms occupied or used as a separate domicile.

Tourist and visitor accommodation has the same meaning as the Standard Instrument – Principal Local Environmental Plan which is a building or place that provides temporary or short-term accommodation on a commercial basis, and includes backpacker’s accommodation, bed and breakfast accommodation, farm stay accommodation, hotel or motel accommodation and serviced apartments.

To avoid doubt, a dwelling or tourist and visitor accommodation (which includes farm stay accommodation) does not include moveable dwellings as defined in the Standard Instrument – Principal Local Environmental Plan, including tents, caravans or other portable structures for human habitation.

A visual impact assessment must be undertaken for any of the following at the time the Planning Secretary’s environmental assessment requirements are issued:

- existing dwellings and tourist and visitor accommodation
- dwellings and tourist and visitor accommodation that have been approved through a development application or complying development certificate, or are exempt from approval, and have physically commenced construction<sup>2</sup>
- dwellings and tourist and visitor accommodation that are constructed but not yet occupied or used.

A visual impact assessment is not required for any dwelling or tourist and visitor accommodation that is, at the time the Planning Secretary’s environmental assessment requirements are issued:

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<sup>2</sup> ‘Physically commenced’ has the same meaning as that in section 96 of the Environmental Planning and Assessment Regulation 2021.

- built illegally (as confirmed by the relevant council)
- derelict (as officially declared by the relevant council)
- under assessment or consideration as part of a development application or complying development certificate application
- approved (under a development consent or complying development certificate) but for which construction has not physically commenced.

In assessing the visual impacts on dwellings, the assessment must focus on views only from the dwelling and not from the property boundary or other parts of the property. The assessment should also consider the potential worst-case views that have the greatest potential to impact residential amenity.

Residential amenity encompasses the overall quality, experience and nature of views and outlooks available to occupants of a dwelling and its immediate surrounds, including pool areas and adjacent gardens.

In assessing the visual impacts on tourist and visitor accommodation, the assessment must focus on views from the buildings that accommodate guests, and/or key areas of the property that significantly contribute to the visitor experience. The assessment should not consider views from areas that are inaccessible to guests or areas that would otherwise be primarily used by the permanent residents.

Where any dwelling or tourist and visitor accommodation has approval but has yet to physically commence construction, the applicant may need to consider the impacts on these development rights. This should be undertaken in accordance with the guidance in section 6 of the [\*Wind Energy Guideline\*](#) and the visual impact assessment process outlined in this document does not apply in these circumstances.

### **Private agreements**

If a private receiver is subject to a private agreement, in which the landowner specifically accepts the full visual impacts of the project, then no assessment is required. Where possible, the scoping report and environmental impact statement should identify these receivers as ‘associated’, including on any relevant maps.

To avoid doubt, this technical supplement does not treat shadow flicker as a visual impact.

Should an applicant enter into a private agreement after submitting an environmental impact statement but before a project is determined, then the applicant should provide this information to the consent authority at the earliest opportunity.

The [\*Private Agreement Guideline\*](#) provides additional guidance.



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# 2

## Landscape character assessment





The environmental impact statement must include an assessment of how the project will affect elements that make up the landscape, its aesthetic and perceptual aspects and its distinctive character.

Landscape character assessment can help the community, applicants and consent authorities understand the sensitivities of a landscape and determine the impact of a project on an area's character and sense of place.

Landscape character is the distinct, recognisable and consistent pattern of elements in the landscape that make one landscape different from another. This includes physical elements, such as geology, soil, climate, flora and fauna, and the way these elements interact with each other. It also encompasses human influences, such as historical, cultural and economic activities that have shaped the land. Landscape character is an objective assessment of the physical and visual attributes of a landscape.

Landscape assessment is distinctly different from visual impact assessment, which solely focuses on individual views. Consequently, landscape character assessment can help to understand the cumulative effect of a project on a much broader area. The key tasks to be undertaken in assessing landscape character impacts are described below.

The level of assessment should be appropriate for the context in which the development is proposed and should be proportionate to the likely impacts, including cumulative impacts, of the development.

The Department of Planning, Housing and Infrastructure encourages applicants to consult with it in scoping the project to determine the level of detail that the landscape character assessment may require.

The study area for the landscape character assessment should generally be 25 km from the proposed development. However, the character of landscapes can vary significantly, and applicants may provide justification for analysing a smaller area.

## 2.1 Baseline analysis

Applicants must conduct a baseline study to establish the existing landscape character of the area and its sensitivity. This should be based on desktop analysis and field visits, and it should provide a descriptive and illustrative analysis of the qualities of the place, what makes it valued and any challenges that could arise from the proposed development.

It is important for applicants to engage with the community (including Indigenous communities), local council and potentially affected landowners as early as possible to identify and establish the importance of particular landscape values and characteristics. Landscape values are the qualities people attribute to a landscape. The values are subjective and reflect the personal, cultural, social and spiritual significance the landscape holds for people. Values can include aesthetic appreciation, cultural heritage, recreation, spiritual connection and ecological importance. Gauging these values can provide a firm basis for siting and designing a wind energy project that seeks to avoid or minimise impacts.

In undertaking consultation, applicants must adopt the approaches and objectives outlined in the NSW Government's *Undertaking Engagement Guidelines for State Significant Projects*.

The baseline analysis should identify and describe the elements that make up the landscape in the study area, including:

- physical influences (such as geology, soils, landform, natural drainage and waterbodies)
- ecological characteristics and land cover of an area (such as whether it is forested, wetland, scrub or grass) and the quality and type of vegetation cover
- the influence of human activity, including land use and management and the character of any settlements and buildings
- key landscape features or attributes associated with high visual interest or quality that stand out visually, including natural (such as a distinctive mountain peak or hilltop), cultural or agricultural features
- the aesthetic and perceptual aspects of the landscape, particularly those that are key contributors to the distinctive character of the landscape (such as its scale, complexity, openness, tranquillity or wildness)
- aspects that have important Aboriginal cultural heritage value (except artefacts and tangible values that would be assessed as part of an Aboriginal cultural heritage assessment) and why they are valuable to the community
- the overall character of the landscape in the study area, including any identifiable distinctive landscape character types or areas (see further guidance below)

- the condition of the landscape, including that of elements or features such as buildings or vegetation
- the planning designations of an area relating to landscape character, including sensitive land use designations, zonings and heritage listings
- the location of any proposed, operational or approved local and regional wind energy developments, including projects that may create direct or indirect cumulative impacts with the project.

Applicants should use descriptive text and photographs to assign scenic quality values and provide a visual profile in the region, including what types of landscape features are typical, less common, rare or unusual, and outstanding. The outcomes of this baseline analysis should inform the visual impact assessment of assessable viewpoints.

## 2.2 Identify landscape character zones

If the landscape includes distinct areas with different qualities, the study area should be broken down into different character zones (Figure 1).

Landscape character zones should divide the landscape based on common distinguishing visual characteristics, including landforms and major land cover patterns. Combinations of vegetation, waterbodies, landforms, and land use form these patterns and allow for the identification of key landscape features.

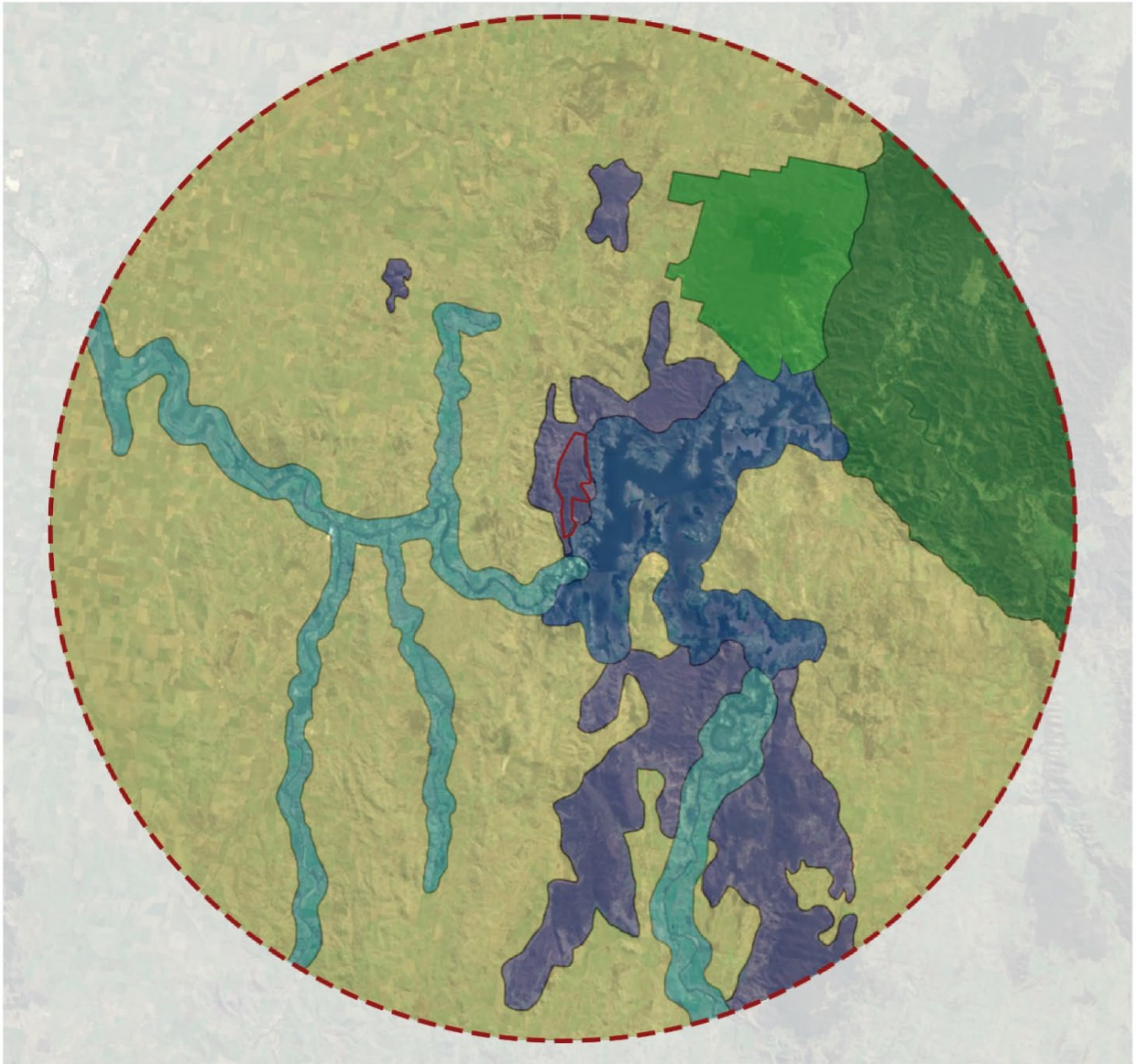
Sources to use to identify and establish the type of regional landscape character zones include:

- Learmonth, Nancy and Andrew (1971), *Regional Landscape of Australia: Form, Function and Change*, Angus and Robertson Publishers, Sydney
- Mitchell, Peter (2022), *Descriptions for NSW (Mitchell) Landscapes Version 2*, NSW National Parks and Wildlife Service
- Tudor, C (2019), *An approach to landscape sensitivity assessment – to inform spatial planning and land management*, Natural England
- Australia's bioregional framework as delineated via the *Interim Biogeographic Regionalisation for Australia (IBRA)*
- *eSPADE spatial viewer for soil landscape mapping*, NSW Environment, Energy and Science.



# Wind Energy Guideline

## Sample Landscape Character Zone Map

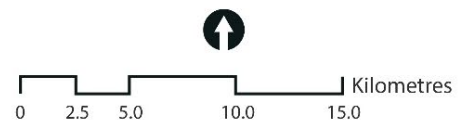


### Legend

- Project area
- - - Landscape character assessment boundary

### Landscape Character Zones (LCZs)

- LCZ 1 - National Park and conservation
- LCZ 2 - State forest
- LCZ 3 - River corridor
- LCZ 4 - Lake and shorelines
- LCZ 5 - Forested ridgelines
- LCZ 6 - Agricultural plains and foothills



Note: All LCZs are hypothetical and do not apply to any real wind energy development at the time of publication. LCZ marked areas are for illustrative purposes only and are not intended to simulate the actual character of the area identified.

Figure 1. Example landscape character zone map

## 2.3 Assess the landscape character impact

Applicants should determine the impact of the proposal on each landscape character zone by evaluating the sensitivity of the landscape and the magnitude of the project's effects in that area.

The sensitivity and magnitude should be assigned a rating (low, moderate or high) that can help determine the overall landscape character impact on any given zone. Applicants must provide rationale for the ratings as part of the assessment.

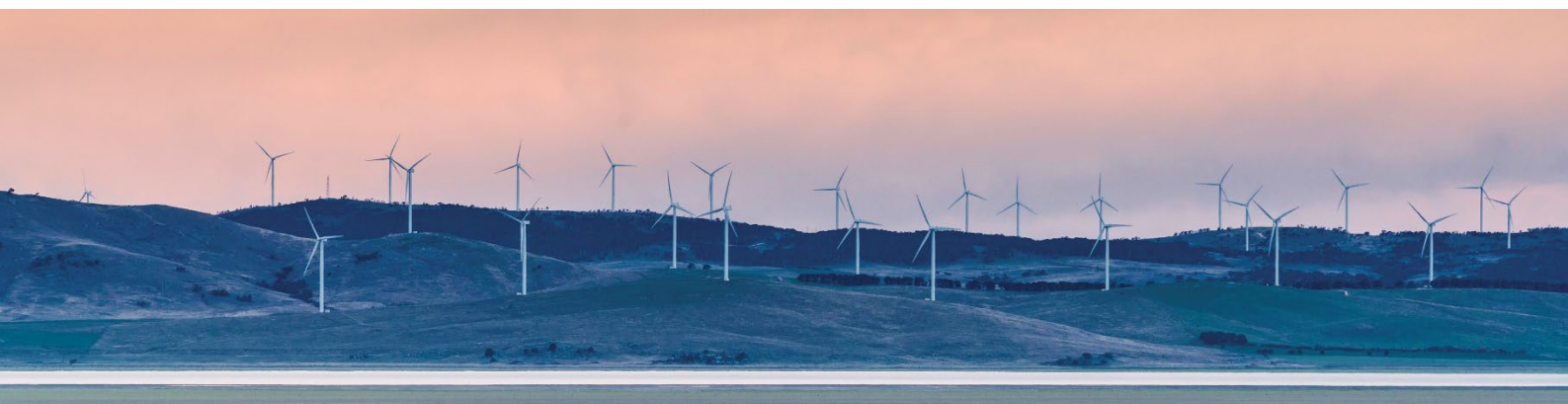
Applicants should consider the following when analysing and rating the magnitude of the project:

- size and scale, including:
  - the extent of landscape elements that may be lost and the contribution those elements make to the landscape character
  - the extent to which the project becomes a minor or major element in the landscape and its dominance in the visual catchment
  - the extent to which the project changes the key characteristics of the landscape that are critical to its distinctive character (including the removal of vegetation)
- geographical area – the area of the landscape that will experience the project's effects. This could vary from the immediate setting of the site to a larger scale, where the project may influence several landscape character zones.

Applicants should rate the sensitivity of the landscape character type based on the inherent capability of the area to absorb changes from the project.

Where impacts are expected to be high, the assessment should propose measures to avoid or mitigate these impacts, including re-siting and resizing project elements. Applicants should then summarise any significant residual impacts on the landscape after mitigation as the final step in the process. Where a project proposes aviation hazard lighting, the landscape character assessment should also consider the magnitude and impacts of the lighting.

Appendix A: Example landscape character assessment provides an example landscape character assessment.





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# 3

## Visual impact assessment framework



A visual impact assessment that considers the likely impacts of the development on public viewpoints and private receivers must accompany applications for wind energy development.

The method for determining the visual impact of a wind energy development is generally based on a combination of the sensitivity of a view to change and the magnitude of the proposal. However, in some settings, wind turbines can be visually dominating despite the sensitivity of the view. Consequently, the visual assessment framework is broken into two key parts: a setback to prevent turbines from being located close to sensitive receivers and an assessment process for all other public viewpoints and private receivers. This section describes these in detail.

### 3.1 Setback

Wind turbines close to sensitive receivers, including dwellings, historic homesteads, tourist and visitor accommodation, places of worship, town centres and central business districts, can be visually dominating despite the scenic quality or importance of the view. For example, a single 240 m turbine generally has a dominant appearance if it's within 1.5 km of a sensitive receiver and is completely visible.

Figure 2 prescribes a setback for turbines that are likely to have a dominant appearance. This setback applies from sensitive receivers and scales, depending on the height of the proposed turbines. If a sensitive receiver is within the setback distance, it will trigger a high visual impact unless topography or vegetation largely screens the turbines (Figure 3).

The setback is equivalent to 9 degrees of a person's vertical field of view. This can be measured and visualised in real world settings using the tools described in Section 3.2.

If a sensitive receiver is eligible for a setback exemption (Figure 3), a visual impact assessment must be undertaken in accordance with the process outlined in section 3.2. In all other circumstances, receivers should be assessed against the high-impact performance criteria in Table 8, which generally require the impact to be avoided. Consequently, applicants should generally avoid siting turbines within the setback unless there would be significant mitigating factors, or they have a private agreement with the affected landowner.



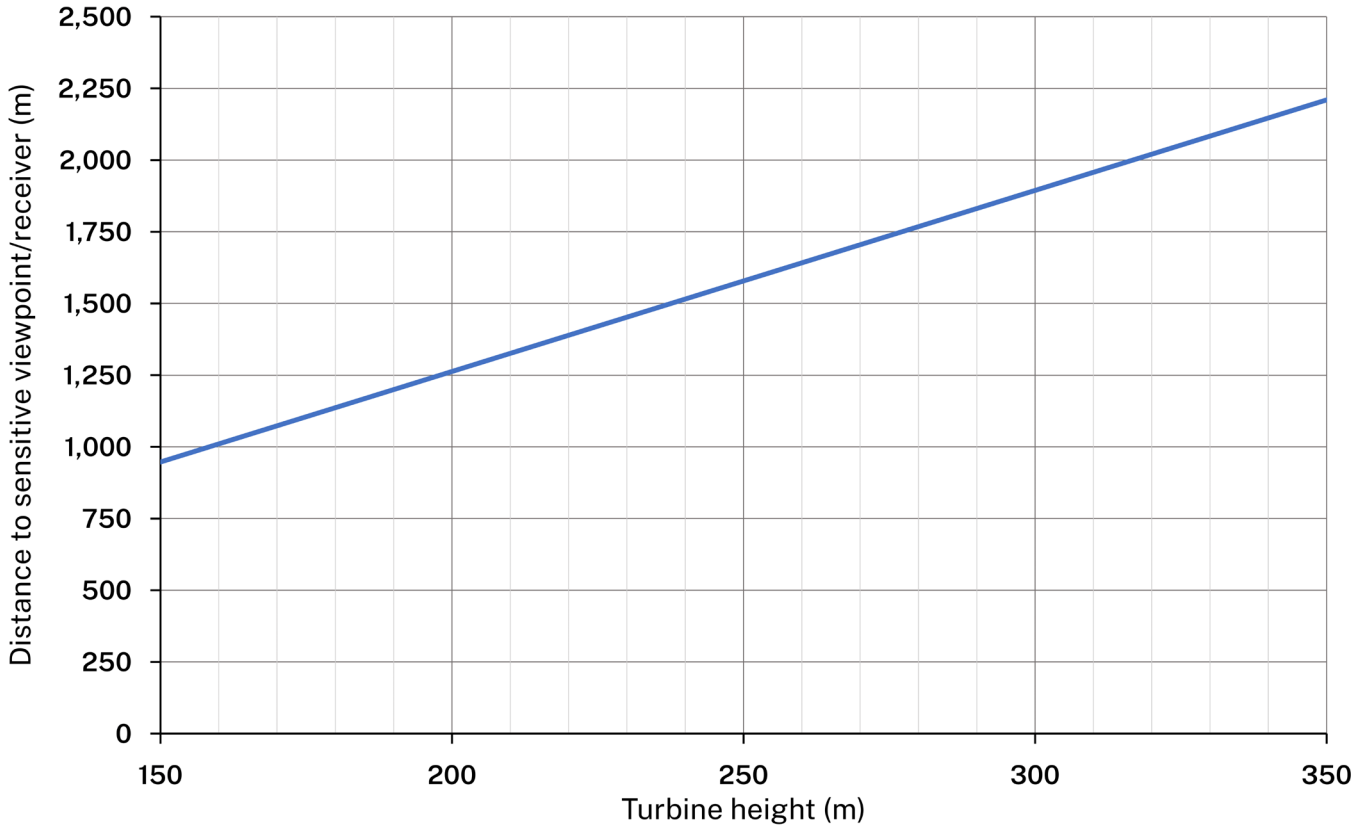


Figure 2. Setback from sensitive receivers

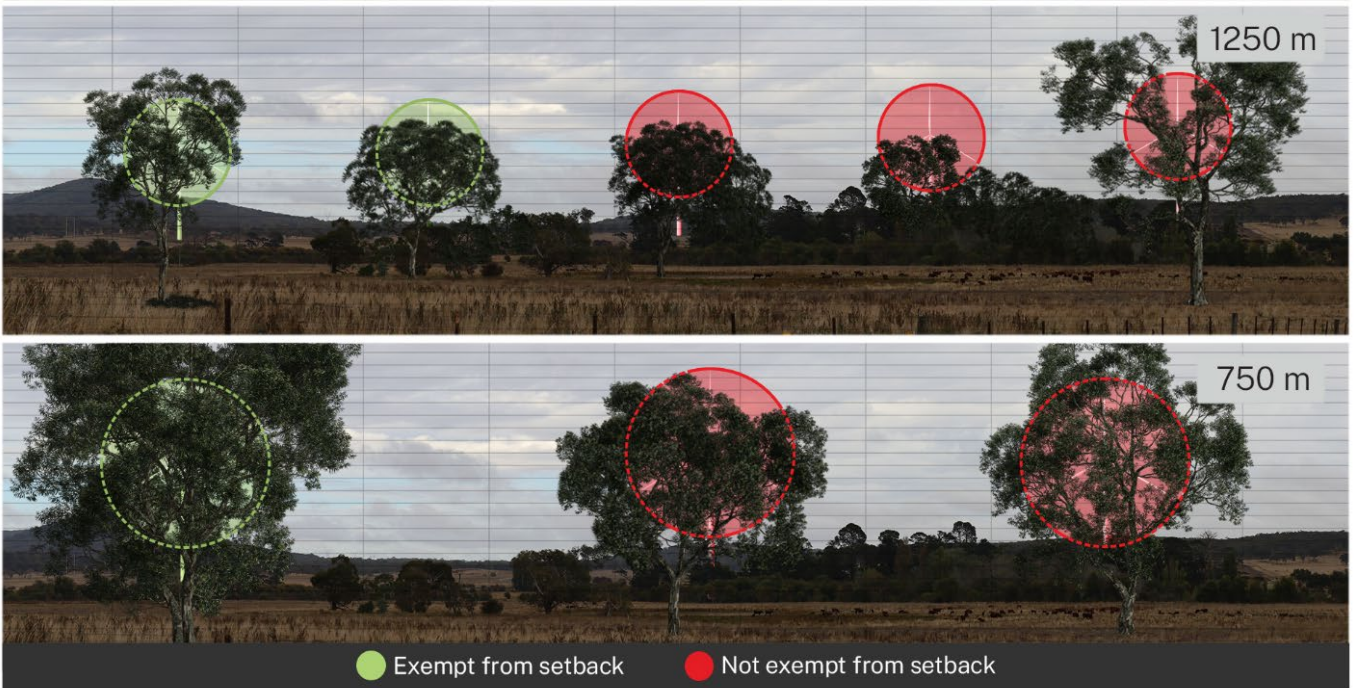


Figure 3. Setback exemptions

## 3.2 Visual impact assessment process

Applicants must conduct a visual impact assessment for all other public viewpoints and private receivers according to the process outlined in Figure 4 and described below. The level of assessment should be proportionate to the likely impacts of the development (see section 4.2).

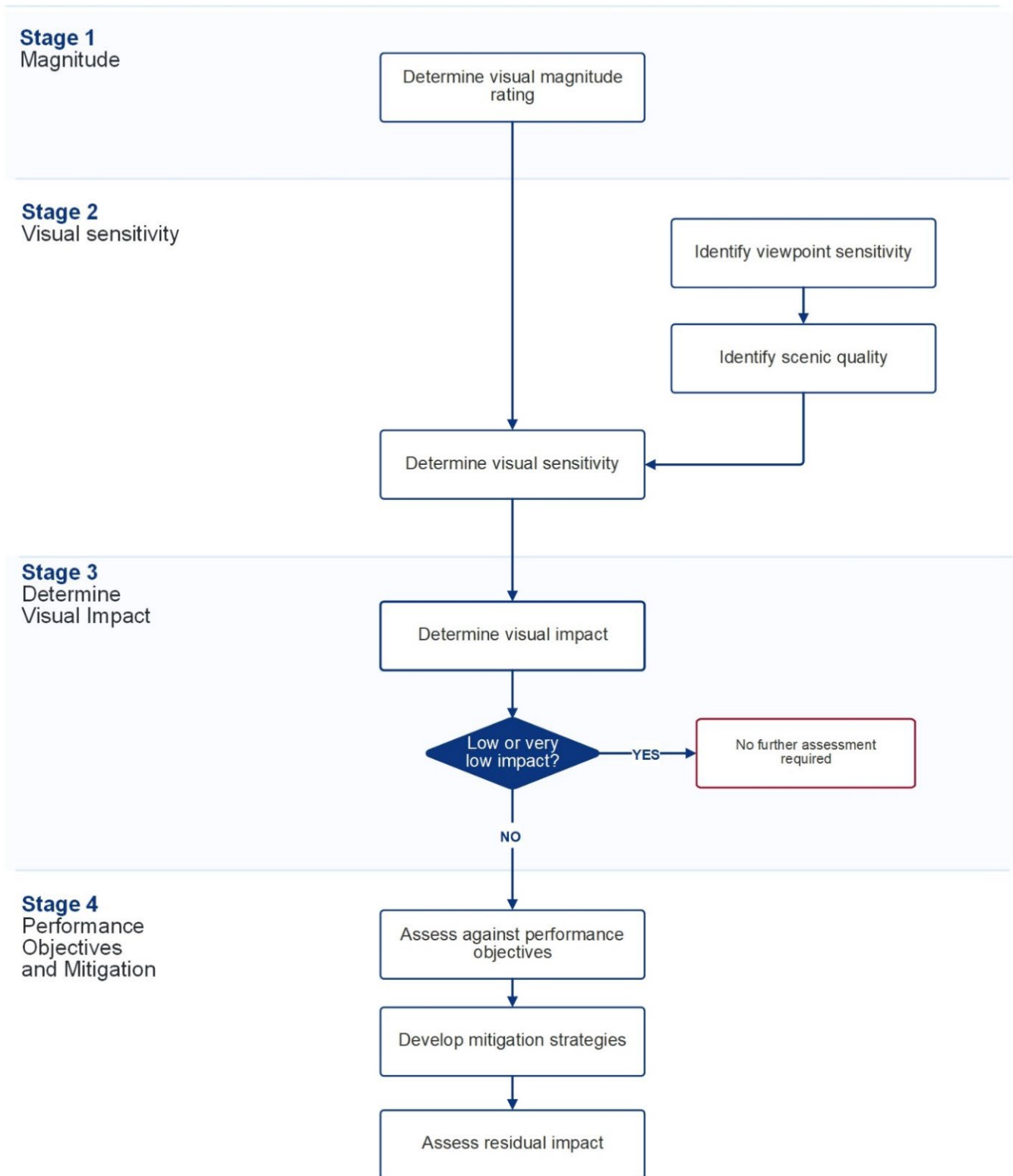


Figure 4. Visual impact assessment process

## Visual magnitude

The visual magnitude of a project is its apparent size within the viewshed. It is a key factor in determining overall visual impact. The typical design and layout of wind energy developments are relatively standard. Assumptions have been made and incorporated into the following methodology to improve the efficiency and consistency of determining the visual magnitude of these projects. For example, almost all wind energy developments comprise similar infrastructure with common characteristics, including colour, texture, movement and contrast with the rural landscapes in which they are typically located.

### Visual magnitude methodology

Visual magnitude should be determined by analysing the volume of the field of view a project would occupy. You can do this by splitting any view into a grid of cells 1 degree high and 10 degrees wide (Figure 5) and counting the number of cells that a project would occupy.



Figure 5. Determining visual magnitude

You can then compare the total number of cells with the visual magnitude thresholds in Table 1 to determine the visual magnitude rating. There are five ratings: very high, high, moderate, low and very low; these indicate the apparent size of the wind energy development from each public viewpoint or private receiver. Appendix B: Visual magnitude examples provides examples of each magnitude rating.

This method is designed to weight vertical changes in magnitude more than horizontal changes. This reflects best practice understanding of visual impacts, including the concept that people are more sensitive to vertical changes to their field of view than horizontal changes.

For example, a 10 m high development that is 100 m wide is likely to have less impact on a viewpoint than if it were 10 m wide and 100 m high. This is particularly true in low-lying regional and pastoral areas where landscapes do not commonly contain natural and built features that occupy large portions of the vertical field of view.

Table 1. Visual magnitude thresholds

Number of occupied cells	Visual magnitude rating
1 to 7	Very low
8 to 14	Low
15 to 25	Moderate
26 to 36	High
More than 37	Very high

Using this concept, there are several ways to calculate magnitude for different purposes and with varying levels of accuracy. These include:

- a practical approach that you can use on location to visualise likely outcomes in real-world settings (Figure 6)
- conservative desktop estimates that you calculate by measuring the worst-case horizontal field of view and determining an indicative vertical field of view using basic trigonometry
- detailed analysis using 3D visualisations of the proposed development, including basic 3D models (wire frames) and photomontages that account for influencing factors such as topography and vegetation screening.

The method to be used, including the process for counting occupied cells, should depend on the use case and be proportionate to the likely impact at each location (see section 4.2).

Since the magnitude of wind turbines decreases over distance, there is a point at which they become inconsequential to the overall visual impact and difficult to discern against the background. Similarly, private landowners have no proprietary right to or ownership of a view, and any assessment should be limited to a reasonable distance. Consequently, any turbine that would be less than 2 degrees in vertical field of view should not be counted when calculating magnitude.

## Visual sensitivity

Visual sensitivity refers to the quality of the view and how sensitive it is to the proposed change. In some cases, visual sensitivity also relates to the direction of the view and where it can be viewed from (such as a resident's living room).

The visual sensitivity is determined by identifying the sensitivity of each viewpoint and receiver and categorising the scenic quality of the area in view.



## Rule of thumb for measuring magnitude

You can roughly measure the field of view that objects occupy in landscapes and our day-to-day lives using nothing more than your hand and fingers (see Figure 6). This provides a practical approach for visualising how the magnitude ratings would appear and how they might compare with other features in the landscape.

To measure part of your field of view, hold your hand at arm's length and close one eye. Make a fist, with the back of your hand facing upwards. The width of your fist is approximately 10 degrees, or one cell wide. The height of your little finger is approximately one degree, or the equivalent of one cell high.

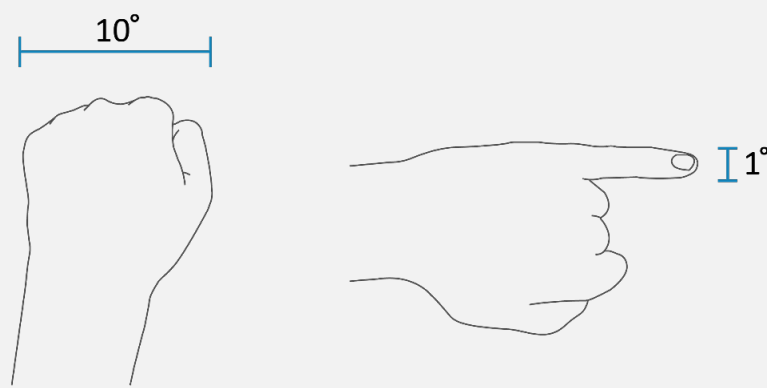


Figure 6. Rule of thumb for measuring magnitude

## Viewpoint sensitivity

Viewpoint sensitivity relates to the relative importance of viewpoints and the value the community or visitors may place on landscapes viewed from public use areas, public travel ways and private receivers such as dwellings.

The sensitivity of each viewpoint must be classified into one of four sensitivity ratings: very low, low, moderate and high considering the examples in Table 2, the baseline landscape study and any consultation with the community and individual landholders. Although Table 2 is a good guide, it is not conclusive, and applicants must consider the other inputs to arrive at the final rating.

Applicants should categorise views from a rural dwelling according to their importance. Primary views are considered more sensitive than secondary views (see Table 3 for guidance and the Land and Environment Court planning principle related to views).<sup>3</sup> Applicants should identify one primary

<sup>3</sup> *Tenacity Consulting v Warringah Council* [2004] NSWLEC140 at 25-29.

view for each dwelling, considering the guidance in Table 3 and the factors that contribute to residential amenity. All other views must be considered secondary.

When conducting simple and intermediate assessments (see section 4.2), applicants may conservatively assume that all views from rural dwellings are from primary viewpoints. Applicants can then refine these assumptions for any rural dwellings that progress to a detailed assessment.

Applicants must identify how they have classified each of the residential viewpoints in the environmental impact statement.

Table 2. Viewpoint sensitivity levels and examples

Viewpoint type	Very low viewpoint sensitivity	Low viewpoint sensitivity	Moderate viewpoint sensitivity	High viewpoint sensitivity
<b>Private receiver</b>	Private recreation areas and sporting fields (land zoned RE2)	Secondary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and environmental or conservation areas (zoned C2, C3 and C4)	Primary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and environmental or conservation areas (zoned C2, C3 and C4)  Tourist and visitor accommodation (bed-and-breakfasts, motels and hotels) and places of worship	Dwellings in residential and rural villages (zoned R1, R2, R3, R4 and RU5)  Historic rural homesteads/residences on the national, state or local heritage list
<b>Public viewpoint</b>	State highways, freeways and classified main roads	Cemeteries, memorial parks  Tourist roads and scenic drives. <sup>4</sup> Significant entry ways to regional towns and cities	Tourist uses in tourist areas (zoned SP3)  Publicly accessible green and open spaces, including picnic areas, parks, public recreation areas and lookouts  Town centres and central business districts	n/a

<sup>4</sup> Tourist road locations are available on the Transport for NSW [Open Data platform](#).

Table 3. Primary and secondary viewpoints from rural dwellings

Primary viewpoint	Secondary viewpoint
Principal/frequented living spaces (for example, living rooms, kitchens and dining areas)	Less frequented living and service areas (for example, bedrooms, laundries, bathrooms, garages and studies)
Front or rear views from a rural dwelling, particularly from any porch, balcony, verandah, entertainment area, adjacent garden, deck or patio	Side views from a dwelling

### Scenic quality

Scenic quality refers to the holistic and relative scenic, cultural or aesthetic value of the landscape within the viewshed. It is based on the presence or absence of key landscape features known to be associated with community perceptions of very low, low, moderate or high scenic quality. It is typically a complex process undertaken by experts in visual impact assessment and must also consider community values.

The baseline analysis and landscape character assessment should inform the classification of scenic quality values, including aerial photos, topographic maps and any relevant information from field visits.

Applicants can use the suggested scenic quality classification criteria in Table 4 as a guide; however, the environmental impact statement should consider whether a combination of landscape features influences the overall scenic quality of the setting as well as any community values.

In other words, the presence of just one or even two high-quality features (such as a visually prominent stream) may be insufficient to justify the landscape as high quality. On the other hand, the presence of one highly valued feature (such as a world heritage area) may be significant in and of itself, regardless of other features.

Table 5 provides a visual reference to help applicants, the community and consent authorities understand how scenic quality values may appear across the categories.

Table 4. Frame of reference for scenic quality values

Viewpoint type	Very low scenic quality	Low scenic quality	Moderate scenic quality	High scenic quality
<b>Landform</b>	<p>Large expanses of flat or gently undulating terrain</p> <p>Indistinct, dissected or broken landforms that provide little illusion of spatial definition or landmarks with which to orient</p>	<p>Mostly flat or gently undulating terrain with isolated areas of undulating topography</p>	<p>Steep, hilly and undulating ranges that are not visually dominant</p> <p>Broad, shallow valleys</p> <p>Moderately deep gorges or moderately steep valley walls</p> <p>Minor rock outcrops</p>	<p>Isolated peaks, steep rocky ridges, cones or escarpments with distinctive form and colour contrast that become focal points</p> <p>Large areas of distinctive rock outcrops or boulders</p> <p>Well-defined, steep valley gorges</p>
<b>Vegetation</b>	<p>Extensively cleared and cropped areas with very limited variation in colour and texture</p> <p>Pastoral areas, human-created paddocks, pastures or grasslands and associated buildings typical of grazing lands</p>	<p>Predominantly cleared and cropped areas with small areas of variation in colour and texture</p> <p>Most pastures or grasslands with small blocks of distinct native vegetation</p>	<p>Predominantly open forest or woodland combined with some natural openings in patterns that offer some visual relief</p> <p>Vegetative stands ranging in size, form, colour, texture and spacing, including human-influenced vegetation (for example, vineyards, plantation forests and orchards)</p>	<p>Strongly defined natural patterns with combinations of native forest, naturally appearing openings, streamside vegetation and scattered exotics</p> <p>Distinctive stands of vegetation that may create unusual forms, colours or textures compared with surrounding vegetation</p>
<b>Waterbodies</b>	<p>Absence of natural waterbody</p> <p>Farm dams, irrigation canals or stormwater infrastructure</p>	<p>Minor water forms, such as creeks and streams</p>	<p>Intermittent streams, lakes, rivers, swamps and reservoirs</p>	<p>Visually prominent lakes, reservoirs, rivers, streams, wetlands and swamps</p> <p>Presence of harbour inlet, bay or open ocean</p>























3. Visual impact assessment framework

Viewpoint type	Very low scenic quality	Low scenic quality	Moderate scenic quality	High scenic quality
<b>Social and cultural</b>	Places of worship, cemeteries, memorial parks, private open spaces	Places of worship, cemeteries, memorial parks, private open spaces  Local heritage sites	Local or state heritage sites  Distinguishable entry ways to a regional city identified in the <u>State Environmental Planning Policy (Transport and Infrastructure) 2021</u>	Culturally important sites, wilderness, world heritage areas and protected areas  World, national and state heritage sites
<b>Human presence</b>	Dominating presence of infrastructure, human settlements, highly modified landscapes and higher density populations, such as regional cities, industrial areas, agricultural transport or electricity infrastructure	Highly modified landscapes with visible infrastructure, such as transmission lines and railway corridors	Dispersed yet evident presence of human settlement, such as villages, small towns, isolated pockets of production and industry, lower scale and trafficked transport infrastructure	Natural, undisturbed landscape  Minimal evidence of human presence and production





Table 5. Visual reference for scenic quality values

Viewpoint type	Very low scenic quality	Low scenic quality	Moderate scenic quality	High scenic quality
Landform				
Vegetation				
Waterbodies				
Social and cultural				
Human presence				

### Visual sensitivity

Once the viewpoint sensitivity and scenic quality are determined, these can be combined using the visual sensitivity matrix in Table 6 to determine the overall visual sensitivity of each viewpoint.

Table 6. Visual sensitivity matrix

Viewpoint sensitivity level	High scenic quality	Moderate scenic quality	Low scenic quality	Very low scenic quality
High viewpoint sensitivity	High	High	Moderate	Low
Moderate viewpoint sensitivity	High	Moderate	Moderate	Low
Low viewpoint sensitivity	Moderate	Low	Low	Very low
Very low viewpoint sensitivity	Very low	Very low	Very low	Very low

### Visual impact

The overall visual impact rating of each viewpoint must be determined for each viewpoint by combining the visual magnitude and visual sensitivity using the matrix in Table 7. Appendix C provides examples of different visual impacts.

Table 7. Visual impact matrix

Magnitude	High visual sensitivity	Moderate visual sensitivity	Low visual sensitivity	Very low visual sensitivity
Very high magnitude	High	High	Moderate	Moderate
High magnitude	High	Moderate	Moderate	Low
Moderate magnitude	Moderate	Moderate	Low	Low
Low magnitude	Moderate	Low	Low	Very low
Very low magnitude	Low	Low	Very low	Very low



## Performance objectives and mitigation

### Performance objectives

Applicants must address the relevant performance objective for each assessable viewpoint and the identified level of impact (Table 8).

Table 8. Visual performance objectives

<b>High visual impact</b>	<p>This level of impact should be avoided unless the applicant has a negotiated agreement with the affected landholder or can justify that:</p> <ul style="list-style-type: none"> <li>• all reasonable efforts have been made to avoid the impact and alternative project designs are not feasible or would be unlikely to materially reduce the impact,</li> <li>• all reasonable mitigation options have been considered,</li> <li>• the proposed mitigation measures would effectively mitigate the impact and would not result in a significant obstruction of views,</li> <li>• the project site is strategically important because of its location, and</li> <li>• the project is in the public interest.</li> </ul>
<b>Moderate visual impact</b>	<p><b>Public road viewpoints</b></p> <p>As far as reasonable and feasible, the applicant should seek to reduce moderate visual impacts to road users. Appropriate mitigation options include vegetation or other screening. Mitigation should only be considered if it would not obstruct important views and sightlines, could be confined to a relatively small area (for example, vegetation screening would not be required for several hundred meters along a transport corridor) and where agreed with the relevant road or rail authority.</p> <p><b>All other private receivers and public viewpoints</b></p> <p>Visual impact mitigation is required in consultation with the affected landowner and should be proportionate to the scale of impact. There is no expectation that this mitigation should eliminate the view of the development entirely, but it must reduce the impact to an acceptable level.</p> <p>Appropriate mitigation options include re-siting or micro-siting, resizing, or reorienting turbines as well as vegetation screening or project landscaping to reduce impacts. If the available mitigation options would be ineffective in reducing impact or are unsuitable due to the nature of the impact (for example, screening would result in obstructed views), then project redesign and/or negotiated agreements should be considered.</p>
<b>Low and very low visual impact</b>	No mitigation required.

## Avoidance and mitigation

Applicants may consider several avoidance and mitigation options as methods of minimising visual impacts.

### Resizing, re-siting or removing infrastructure

Turbines and other associated wind energy infrastructure (roads, buildings, electricity transmission) can be resized to reduce visual magnitude and to reduce impacts from sensitivity viewpoints. Alternatively, turbines and other project infrastructure could be re-sited to locations where they will have less visual impact. Removal of turbines should also be considered if there are limited options available to re-site parts of the project. This should be the first measure applicants consider, and the consent authority may also consider it when assessing the project.

### Vegetation screening

Vegetation screening, or planting trees and shrubs, may be useful for visually screening wind energy developments or other potential visual impacts (such as night lighting). Applicants should first consider onsite screening, such as perimeter planting. If this unlikely to be effective, they can consider screening at affected public viewpoints and private receivers.

However, applicants must consider several limitations of vegetation screening. It can obstruct landscape views, resulting in further impacts to particular views. It can also take many years to establish, and during drought or other unfavourable conditions, it may not achieve optimal growth or have the desired screening effect.

Given these considerations, vegetation screening should not result in significant impacts on the amenity of private receivers (such as obstructed scenic views), and applicants should design it in consultation with the affected landowner.

Applicants should select appropriate plant species that suit the environment (for example, drought-tolerant native species, if relevant), are typical of the area and maintain their foliage throughout the year. If possible, they should be suitably mature to provide maximum screening effectiveness in the shortest possible time. Applicants should use vegetation of various heights to ensure the most effective screening and should plant vegetation as soon as possible to reduce the time that impacts would be unmitigated.

### At-receiver mitigation

As an alternative to other mitigation options, applicants may consider using at-source treatments at affected public viewpoints and private receivers in consultation with the landowner. These options could include landscape treatments or building other structures or features (for example, a shed) to screen views. Any agreed mitigation must be subject to a private agreement.

### Neighbour agreements

Applicants may consider agreements with specific landowners as a form of mitigation. The *Private Agreement Guideline* for provides more information about these agreements.

### Residual impact assessment

Applicants should also assess the visual impact that would remain after adopting mitigation measures to determine whether the overall visual magnitude rating of the project would decrease.





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# 4

## Level of assessment





Applicants must conduct an assessment that is proportionate to the likely impacts on each viewpoint and receiver. This section identifies the level of assessment in the scoping report and environmental impact statement.

## 4.1 Scoping report

Scoping presents an opportunity for applicants to select sites, designs and layouts to avoid and mitigate significant visual impacts. Consequently, applicants should consider the visual impact assessment process and tools in scoping and designing a project.

The scoping report must include a visual impact analysis that identifies public viewpoints and private receivers that require assessment in the environmental impact statement. Applicants should also use this process to identify where to focus consultation with landowners and the local community.

As part of this process, applicants must conduct a mapping exercise that includes the following steps. You can find further guidance on the contents and form of a scoping report in the department's *State significant development guidelines – preparing a scoping report*.

### Study area

The first step of scoping is for applicants to identify a visual study area. They can determine the extent of the study area using the maximum height of the proposed wind turbines and the distances set out in Figure 7. As an example, the study area for 250 m turbines is 7.2 km.

### Viewshed mapping

Once applicants have defined the study area, they must conduct viewshed mapping to identify areas from which the project could be visible. This process eliminates the need to assess viewpoints within the study area that have no line of sight to the wind energy development. Applicants should base viewshed mapping on the maximum height of the proposed wind turbines and use geographic information systems to account for topography. They must not account for other intervening factors, including built structures and vegetation screening.

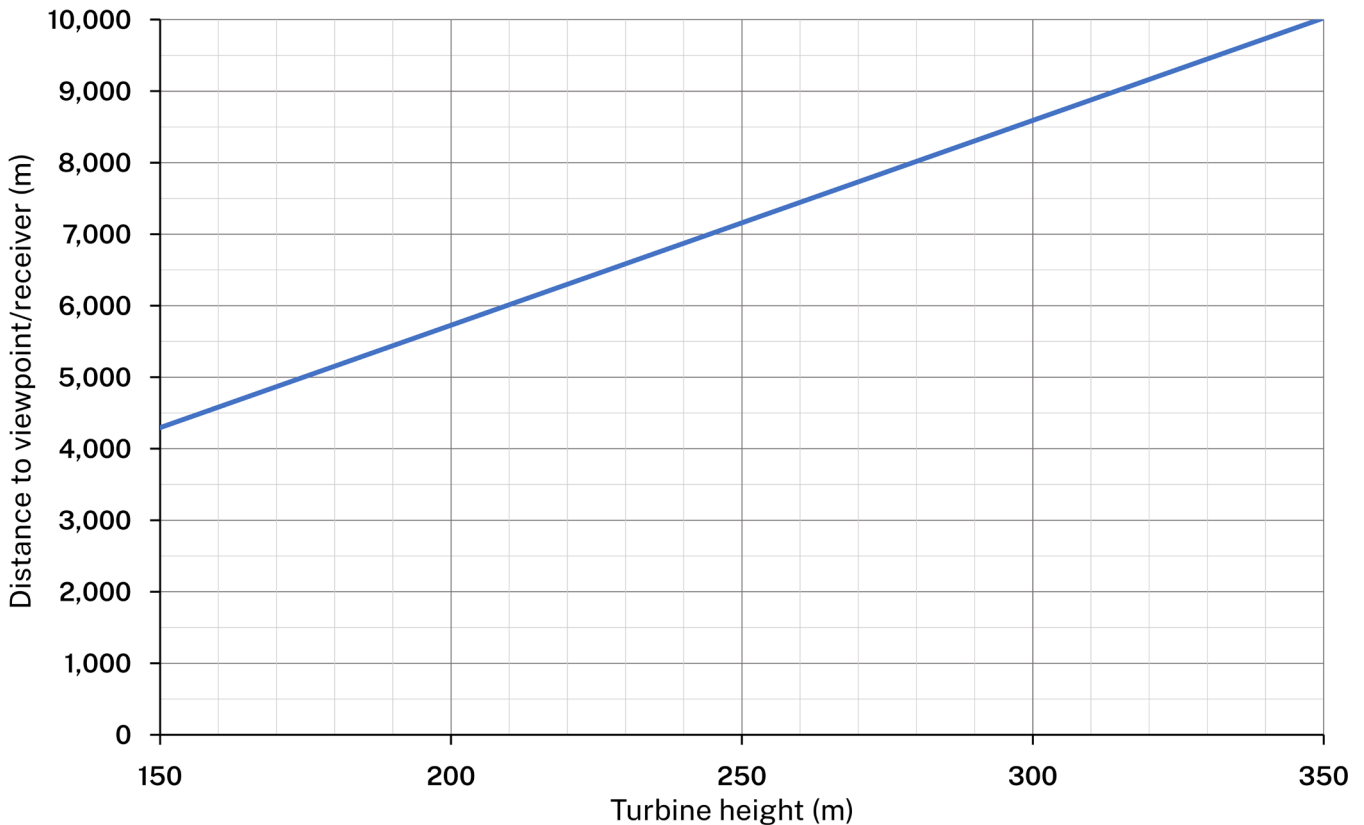


Figure 7. Extent of the scoping study area

## Identifying potentially affected viewpoints and receivers

The last step is to identify public viewpoints and private receivers that would have line of sight to the project and sit within the study area. Applicants should use Table 2 to help identify potential viewpoints; however, they need not identify the precise category of each viewpoint at this stage. Applicants should consider additional viewpoints if ancillary infrastructure, such as substations, could potentially cause impacts. Applicants should label all viewpoints for identification and keep this consistent through the assessment process.

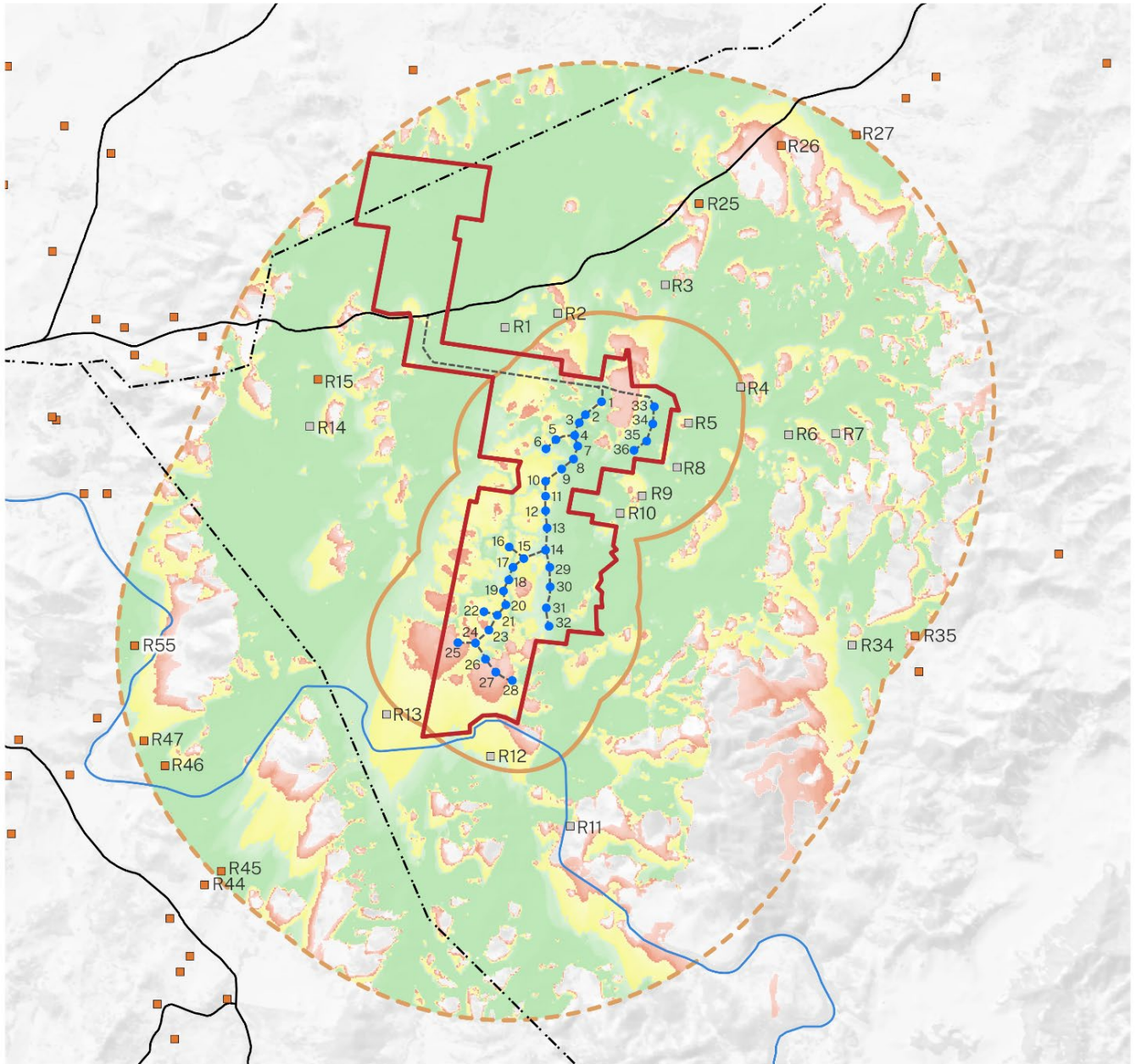
## Scoping map

The results of the scoping analysis should be presented on a map (see Figure ) and included in the scoping report. The map should identify the:

- proposed turbine locations
- study area
- results of the viewshed mapping analysis
- relevant setback area calculated in accordance with Figure 2
- location of public viewpoints and private receivers (including whether they are subject to any host or other negotiated agreement and are therefore associated with the development).

# Wind Energy Guideline

## Sample Scoping Map



### Legend

**Project**

- Project area
- Wind turbine
- - - Access road

**Features**

- Roads
- - - Transmission line
- Waterway
- Non associated dwelling
- Associated dwelling

**Visual Impact Assessment**

- Setback
- - - Study area
- 1-14 visible turbines
- 15-29 visible turbines
- 30-36 visible turbines

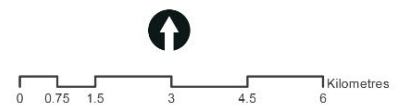


Figure 8. Sample scoping map

## 4.2 Environmental impact statement

### General requirements

All public viewpoints and private receivers identified in the scoping report need to be assessed in some level in the environmental impact statement. A full visual impact assessment is not required if features completely obstruct the view of the project. In such cases, applicants must provide evidence that intervening topography, screening or structures would eliminate any impact.

### Representative receivers and viewpoints

Although assessing each private receiver individually is preferable, applicants may select and assess representative viewpoints in lieu of multiple dwellings. This can be appropriate when private receivers are clustered close together or when a view is representative or represents a worse case than views located nearby or further away. The types of private receivers that can be assessed by representative views include:

- rural residential areas
- rural villages
- urban residential.

When using representative viewpoints, applicants must:

- clearly identify the number and location of dwellings that are the subject of the selected representative viewpoint
- carefully assess the topography and vegetation of the selected viewpoint area to identify the most sensitive viewpoint with the highest visibility of the proposed project (that is, the worst-case) location in the selected areas as the representative viewpoint.

Applicants should not use representative viewpoints for views from the public domain except for public road viewpoints. They should also not use them for dwellings within the setback.

### Setback assessment

If a sensitive receiver is located within the setback (and not subject to a negotiated agreement), applicants should prepare a photomontage according to the requirements in Appendix D. A photomontage is a composite image generated by overlaying a panoramic photograph with a computer-generated model of the proposed development (see examples in Appendix C).



When produced consistently, panoramic photomontages provide a highly effective means of helping stakeholders and consent authorities appreciate the visual presence of a proposed development in context with the landform, land uses and vegetation.

It may not be possible to prepare photomontages in all scenarios (for example, if a landowner does not grant consent for taking photographs from privately owned land). Applicants should make their best efforts to gain access to private land and prepare photomontages. However, applicants can use alternative tools in these circumstances (see Appendix D).

Applicants should use the photomontage to do one of the following:

- demonstrate that the private receiver is eligible for an exemption from the setback (see Figure 3)
- support their justification of high visual impact, with regard to the performance objectives in Table 8.

If the sensitive receiver is eligible for an exemption from the setback, then applicants should also conduct a visual impact assessment according to the following sections and the process described in section 3.2.

## Proportionate visual impact assessment

A visual impact assessment must be undertaken for all public viewpoints and private receivers identified in the scoping report (in accordance with the process outlined in Section 3.2) unless:

- there is no line of sight to the project, and applicants can provide evidence that mitigating factors would eliminate any impact from the project
- the impacts can be assessed by a representative viewpoint or receiver, or
- a private receiver is located within the setback and would not be eligible for an exemption.

The level of assessment required should be proportionate to the likely impacts. Applicants can begin by carrying out a simple assessment using desktop data and high-level assumptions. They should then conduct further assessment if impacts are likely to be moderate or higher. Figure 9 and the paragraphs below describe this process. Applicants should also prepare the assessment according to the requirements and examples in Appendix E.



### Simple assessment

Conduct a basic assessment using worst-case assumptions about the likely magnitude and visual sensitivity. Proceed to undertake an intermediate assessment if impacts could be moderate or higher.

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### Intermediate assessment

Produce wireframes to more accurately determine the magnitude rating. Proceed to undertake a detailed assessment if impacts continue to be moderate or higher.

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### Detailed assessment

Prepare photomontages and undertake field visits to more accurately assess scenic quality and determine the effectiveness of existing or proposed screening in mitigating potential impacts.

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Figure 9. Proportionate visual impact assessment

## Simple assessment

Simple assessment provides a relatively streamlined way to eliminate the need for detailed assessment of public viewpoints and private receivers that are likely to experience low and very low impacts. The simple assessment can generally be undertaken at a desktop level using the approach below.

If the simple assessment indicates that a moderate or high impact is likely, then applicants must conduct an intermediate assessment (or detailed assessment if they choose). The environmental impact statement must present the outcomes of the simple assessment for each viewpoint and receiver (or representative location), unless applicants conduct an intermediate or detailed assessment.

## Determining visual sensitivity

At this stage, the characterisation of viewpoint sensitivity and scenic quality can be informed by conservative assumptions. For example, it could be assumed that all views from rural dwellings are primary views to avoid extensive field work and site visits. Applicants can later refine this information as part of an intermediate or detailed assessment if moderate or high impacts could be expected. Applicants can also use desktop analysis to derive scenic quality. However, information and site visits that have been undertaken to inform the landscape character assessment should support this desktop analysis (see section 2).

## Calculating potential magnitude

Simple assessment can rely on a theoretical calculation of the likely magnitude using simple parameters, including the height of the proposed turbines and the distance of the nearest turbine from each viewpoint. This potential magnitude is a conservative and worst-case scenario that ignores mitigating factors, including topography, vegetation and buildings.

To calculate potential magnitude:

1. Determine the worst-case vertical field of view from the viewpoint using trigonometry (see below), Figure 10 or tools on the Department of Planning, Housing and Infrastructure's website to determine a conservative number of vertical cells that the project could occupy.
2. Measure the horizontal field of view of the project and any proposed or approved wind energy projects from each viewpoint (not considering vegetation). You can do this conservatively by measuring the absolute width of the project or more accurately by measuring clusters of turbines. Divide the resulting measurement by 10 to determine the approximate number of horizontal cells that the project would occupy.
3. Multiply the vertical and horizontal cells and compare that figure to the magnitude thresholds in Table 1 to determine the potential magnitude.

### Calculating potential magnitude using trigonometry

$$\text{vertical field of view (degrees)} = \tan^{-1} \left( \frac{\text{height of turbine (m)}}{\text{distance from turbine (m)}} \right)$$



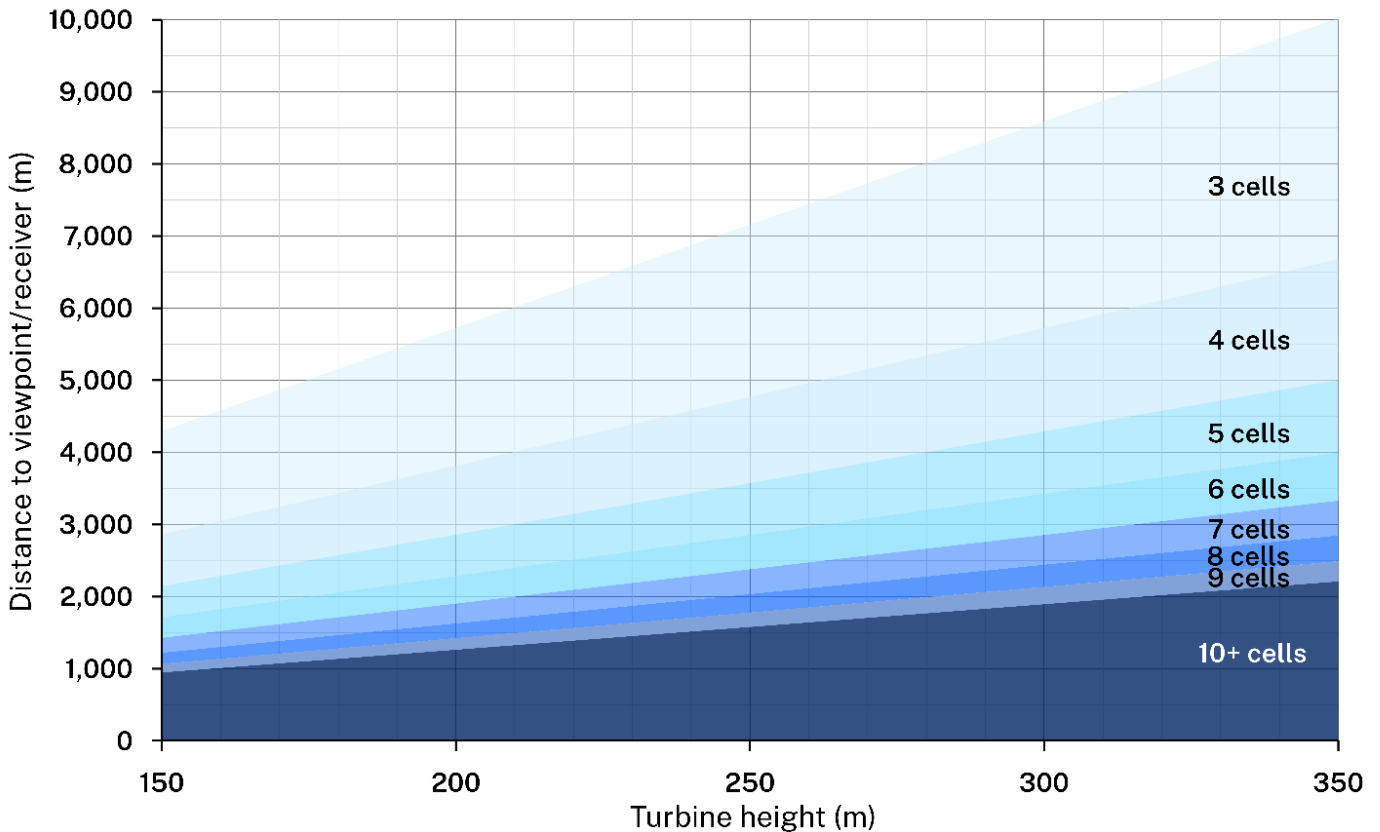


Figure 10. Potential vertical magnitude

## Intermediate assessment

Intermediate assessment provides an opportunity to more accurately determine the visual magnitude of a proposal. This involves 3D modelling which can account for many of the factors that influence magnitude including intervening topography, the different distances at which turbines will be visible, and spacing between individual and clusters of turbines.

If the intermediate assessment indicates that a moderate or high impact continues to be likely, then applicants must conduct a detailed assessment. The environmental impact statement must present the outcomes of the intermediate assessment for each public viewpoint and private receiver (or representative location) unless applicants conduct a detailed assessment.

## Calculating magnitude

Building on the assessment outputs from the simple assessment, applicants can replace the calculation of potential magnitude with the use of a visual magnitude grid tool to achieve a more certain calculation of a project's bulk and scale relative to a view.

This tool is a transparent grid that, when overlaid with an accurate 3D representation of a proposed project, can ensure a consistent way to understand the visual magnitude. Figure 11 and the paragraphs below describe this process in further detail.



To calculate visual magnitude for an intermediate assessment:

1. Produce a 3D model (such as a wireframe or wireline model) that:
  - a. comprises 180 degrees of horizontal field of view
  - b. is generated using a bare earth digital terrain model
  - c. includes proposed wind turbines at full vertical alignment (blade tip at the highest point in rotation) and fully facing the viewer
  - d. identifies the number of each turbine
  - e. includes any visible proposed or approved wind energy projects.
2. Overlay the visual magnitude grid tool on the wire frame image.
3. Identify and count the number of grid cells that the project would occupy.
4. Determine the magnitude rating based on the number of cells and the thresholds in Table 1.

When overlaying the grid, it should be scaled (so the aspect ratio remains unchanged) to ensure that the width matches the wireframe. The grid tool is available in various file formats on our website.

Once scaled appropriately, the visual magnitude grid tool should be moved incrementally to accurately cover the number of cells the project would occupy and to reduce partly occupied cells. In particular, the grid should be positioned to avoid vertical grid lines aligning with turbine masts, as far as is practicable.

Once the grid has been applied to the wireframe, applicants must identify the number of cells that the built form of the project occupies. Applicants must account for the full vertical extent of all visible turbines within the field of view (unless 2 degrees or less). A cell is occupied if it contains any part of a turbine except if the swept area of a turbine occupies less than 25% of a cell. The swept area of each wind turbine should be identified in the panoramic image.

Figure 12 provides examples of occupied and unoccupied cells.



Figure 11. Steps to determine visual magnitude for an intermediate assessment

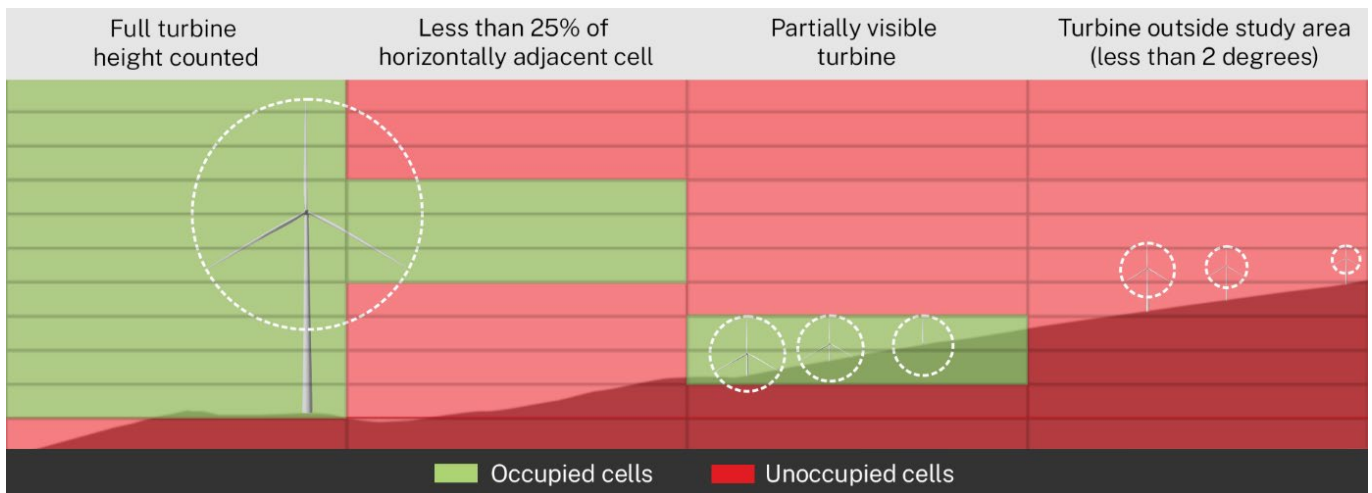


Figure 12. Visual reference for identifying occupied cells

## Detailed assessment

Detailed assessment provides an opportunity to refine the magnitude and visual sensitivity inputs using panoramic photomontages and field visits. Photomontages can be used to refine the visual magnitude by considering the mitigating effects of existing vegetation and scenic quality by considering specific attributes of individual views.

Consequently, if a detailed assessment is required, it should be supported by a panoramic photomontage that is prepared in accordance with Appendix D: Photomontage requirements, land access and alternatives. However, preparing montages for all scenarios may not be possible (for example, if a landowner does not grant consent for taking photographs from privately owned land). Applicants should make their best efforts to prepare photomontages according to the guidance in Appendix D. They can use alternative tools in lieu of a photomontage when land access is not possible (see Appendix D).

Although photomontages are highly effective visual communication tools, they can under-represent the view when compressed on a small page. For this reason, the assessment of each viewpoint must also include a full-size 50 mm image of the area of the photomontage with the highest magnitude. This will more appropriately represent the view of the development from the human eye. Where appropriate, the accompanying 50 mm image should comply with the photographic requirements in Appendix D.

## Refining visual sensitivity

As part of a detailed assessment, applicants should refine elements of visual sensitivity through field visits. These visits should verify information about scenic quality, having regard to specific features within the view from each public viewpoint and private receiver. They should also verify information about viewpoint sensitivity, particularly whether views from rural dwellings are primary or secondary (see Table 3).

## Refining visual magnitude

Building on the assessment outputs from an intermediate assessment, applicants can refine the calculation of magnitude to account for the mitigating factors of existing vegetation or other screening.

To refine the magnitude:

1. Capture a panoramic photograph from the viewpoint that comprises 180 degrees of horizontal field of view towards the project.
2. Superimpose a 3D-rendered model and the magnitude grid tool on the panoramic photograph.
3. Verify whether vegetation or built elements would obstruct any elements of the project.
4. Recalculate the magnitude rating based on the number of occupied cells and the thresholds in Table 1.

Existing screening should be considered effective, and a cell unoccupied if:

- existing vegetation would substantially screen elements of the project (to the point where moving blades are barely discernible through vegetation) such that any residual view would be very intermittent
- any existing screening would effectively mitigate the view of the project such that moving the viewpoint a few metres in any direction would not significantly change the amount of screening
- the vegetation is not temporary, seasonal or identified as a common weed.

Figure 13 provides examples of effective and ineffective vegetation screening. Although these examples provide a guide, applicants should still use professional and reasonable judgement on a project-by-project basis.

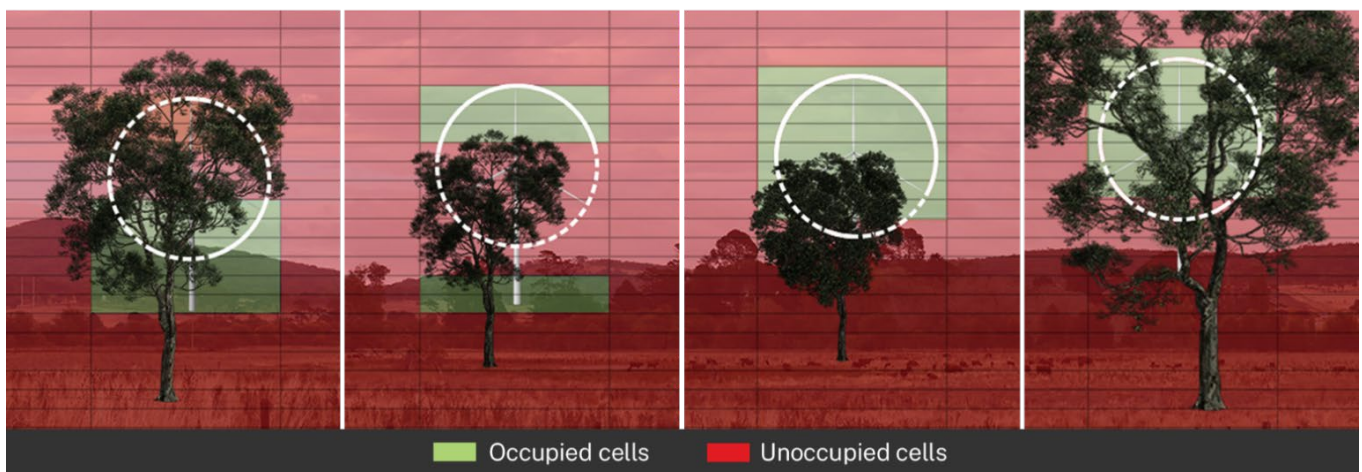


Figure 13. Visual reference for considering existing vegetation screening



## Assessment against performance objectives

If, after the above analysis, the visual impact is moderate or higher, applicants must assess the impact according to the performance objectives in Table 8.

If applicants propose screening to mitigate an impact, they must prepare a photomontage to visualise the likely effectiveness of the vegetation (see Figure 14). They should present this photomontage with and without an overlay of the visual magnitude grid tool and indicate the age of the vegetation.

The environmental impact statement must also:

- include details of the proposed landscaping, including the type and species of any trees, shrubs, grasses and ground covers to be used
- demonstrate that the proposed landscaping has a reasonable likelihood of mitigating the impacts due to the mature height and spread of the species
- include indicative timeframes for establishing vegetation, including an estimate for when the vegetation would achieve the desired mitigation level.

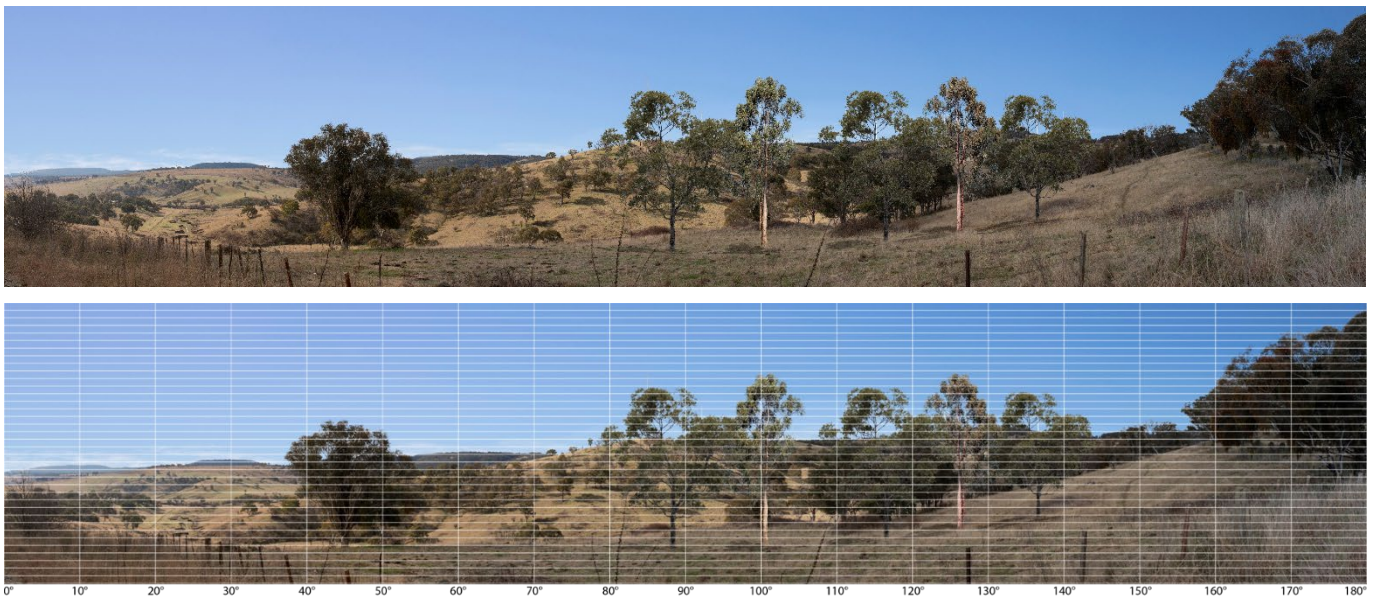


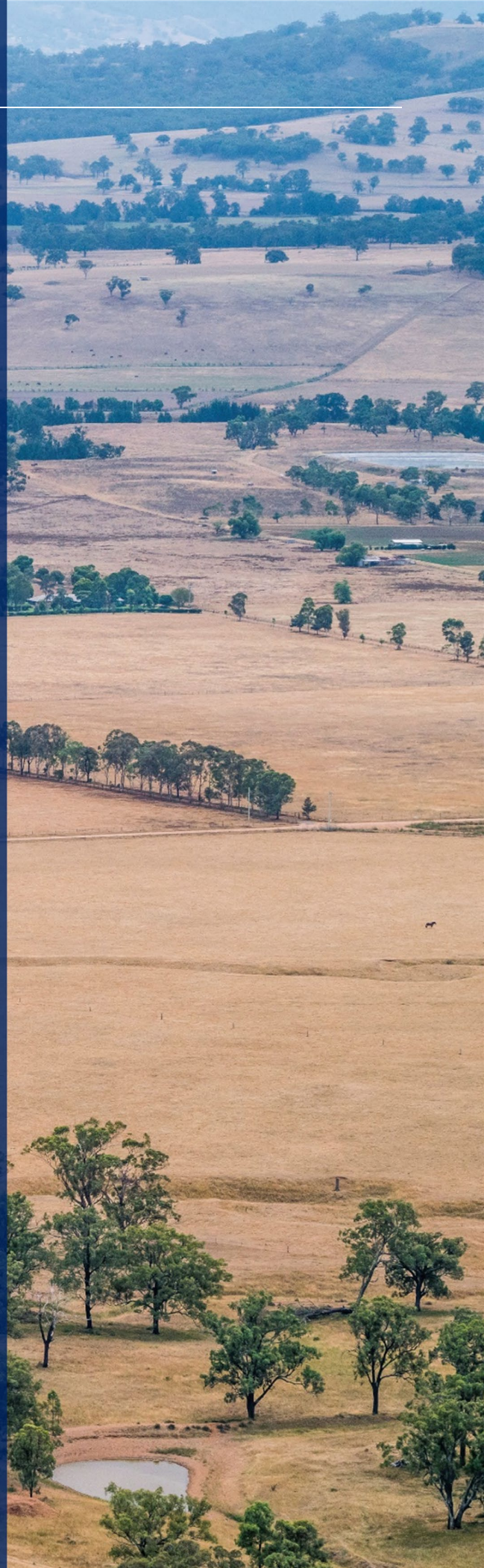
Figure 14. Photomontage with mitigation



# Appendix

# A

## Example landscape character assessment



Landscape character zone	Sensitivity	Magnitude	Landscape character impact
<b>Landscape character zone 1: Undulating farmlands</b>	<p><b>Low</b></p> <ul style="list-style-type: none"> <li>The landscape has been highly modified from its natural state to support grazing and cultivation.</li> <li>Human modifications are clearly evident through widespread clearance of native vegetation and the presence of roadways, dwellings, ancillary agricultural buildings and domestic scale electricity infrastructure. As such, it has some capacity to absorb change from the proposed wind energy development.</li> <li>No specific planning controls attribute special value to this landscape.</li> <li>The landscape elements that contribute to its quality will remain unchanged.</li> <li>The wind energy development would not disrupt any key landscape features.</li> </ul>	<p><b>Low</b></p> <ul style="list-style-type: none"> <li>Some elements of the project, predominantly ancillary infrastructure, are proposed within this landscape character zone.</li> <li>The proposed infrastructure in this landscape character zone will result in a minor change in landscape characteristics at close range. However, the extent of this change is minor in relation to the extent and use of this landscape character zone.</li> <li>The proposed infrastructure is of a scale and form that is commensurate with the built form typology and could be absorbed by the landscape.</li> </ul>	<p><b>Low</b></p>
<b>Landscape character zone 2: Forested mountain range or ridgeline</b>	<p><b>Moderate</b></p> <ul style="list-style-type: none"> <li>This landscape character zone is generally heavily vegetated and relatively unmodified, particularly along ridgelines.</li> <li>It consists of conservation areas and is characterised by forested</li> </ul>	<p><b>Moderate</b></p> <ul style="list-style-type: none"> <li>When viewed from afar, the position of the project along the ridgeline is likely to disrupt the skyline of this prominent landscape feature. In other words, the project will compete with the</li> </ul>	<p><b>Moderate</b></p>



Landscape character zone	Sensitivity	Magnitude	Landscape character impact
	<p>ridgelines that form a prominent landscape feature.</p> <ul style="list-style-type: none"> <li>• Some clearing and lightly modified landscapes are present in the lower foothills and fringes of the landscape character zone, including some large lot residential uses.</li> <li>• Some high-voltage transmission lines transect part of the landscape character zone.</li> </ul>	<p>landform and associated vegetation.</p> <ul style="list-style-type: none"> <li>• When viewed from within the landscape character zone, views towards the project are expected to occupy a small portion of the horizontal and vertical fields of view, often through gaps in vegetation and topography. This will minimise their ability to impact the character of this landscape character zone.</li> </ul>	



# Appendix

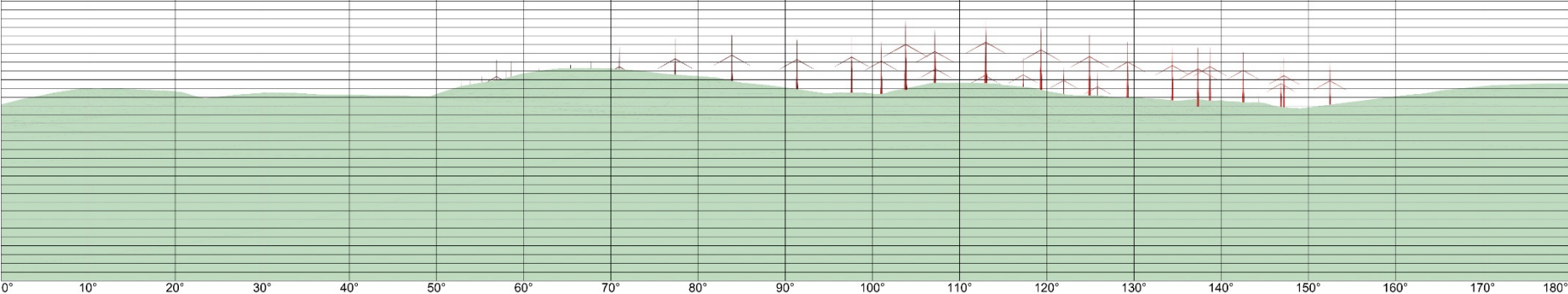
# B

## Visual magnitude examples

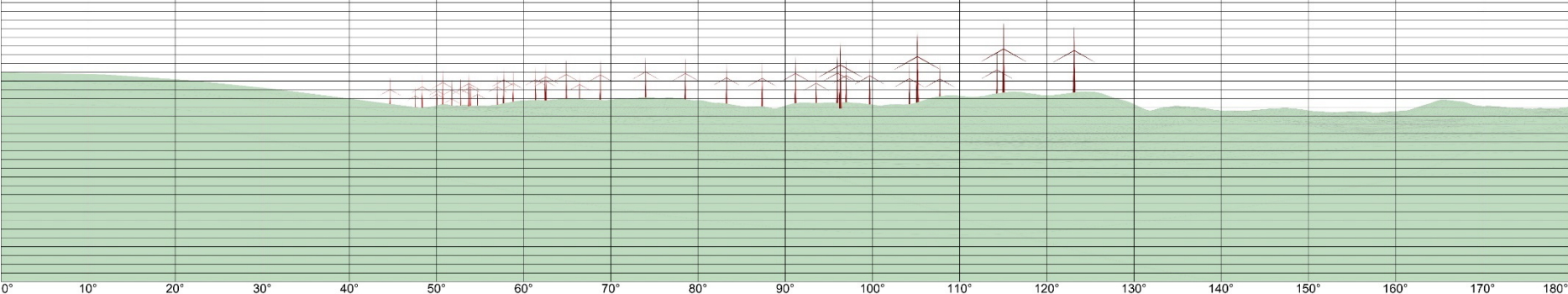


The following examples depict the magnitude of wind energy development with approximately 300 m high turbines. These are highly conservative examples that do not consider intervening vegetation or other mitigating factors.

**2-3km from development**

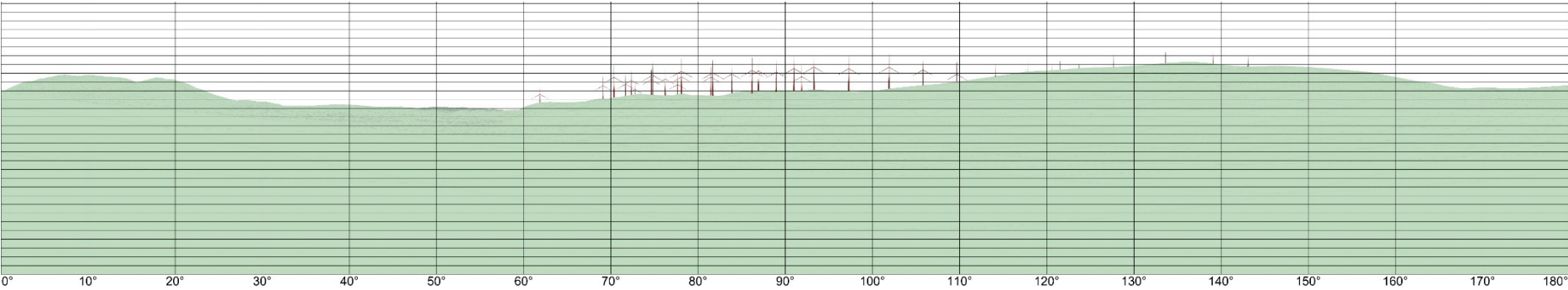


Very high magnitude

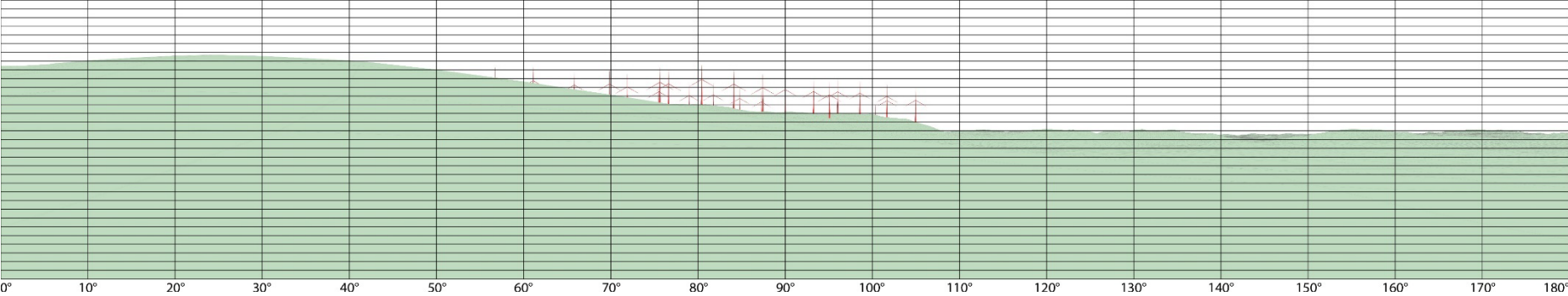


Very high magnitude

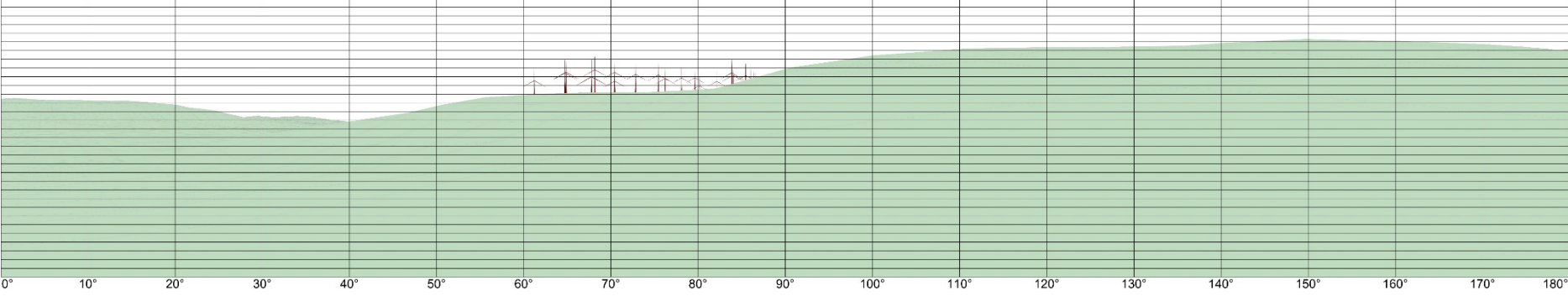
### 3-5 km from development



High magnitude

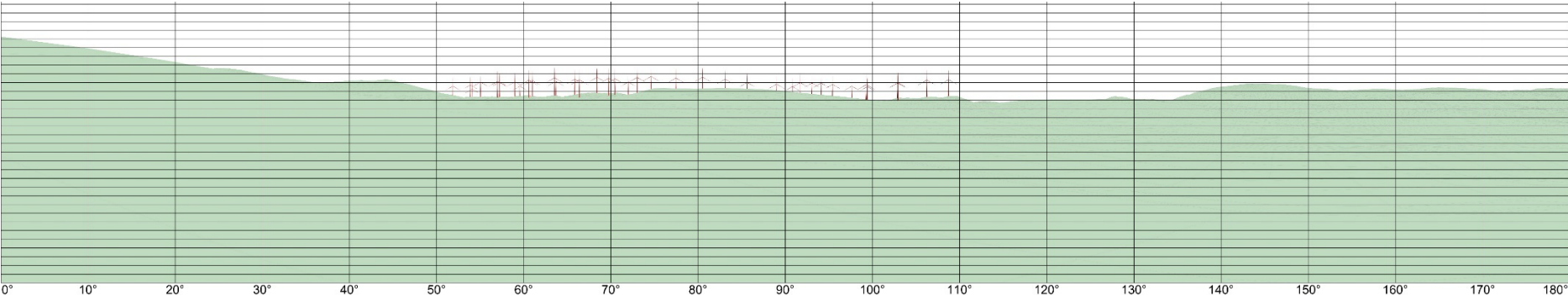


Moderate magnitude

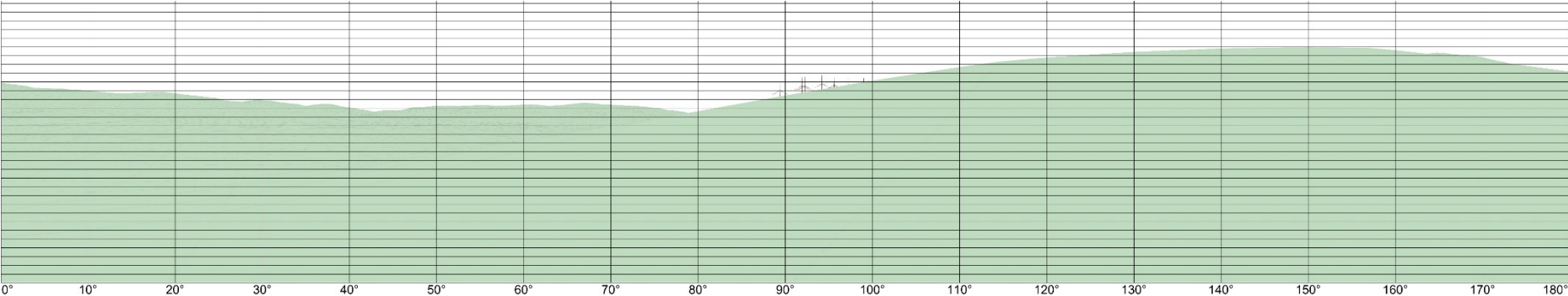


Low magnitude

### 5-9km from development



Moderate magnitude



Very low magnitude



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# Appendix

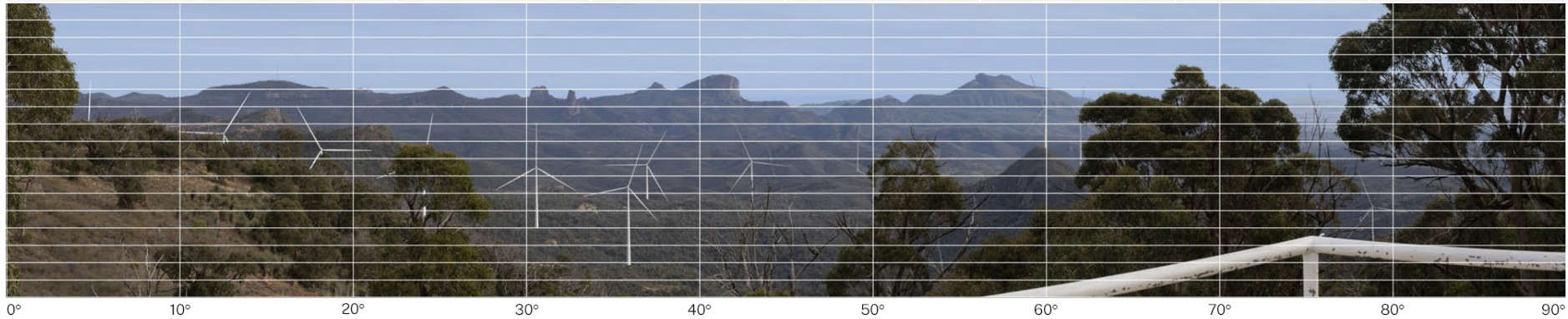
# C

## Visual impact examples

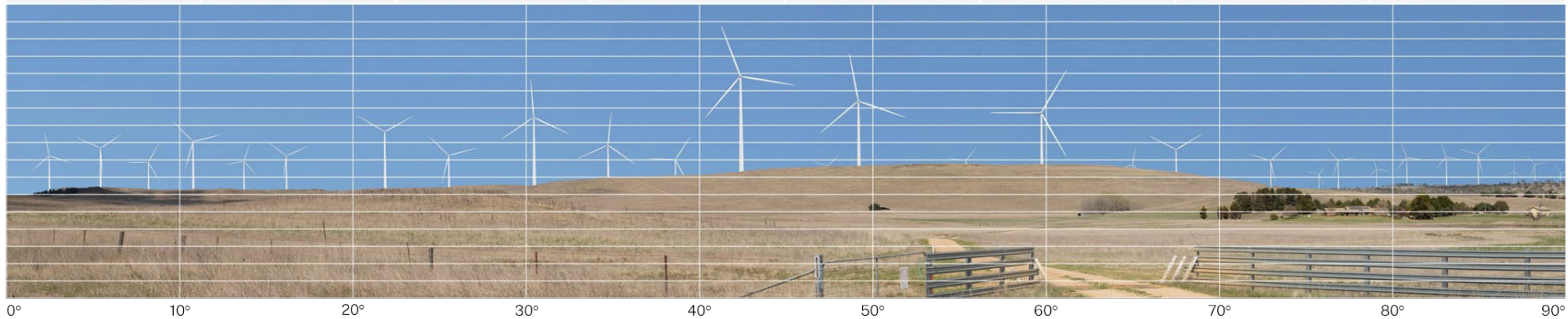


Private receivers

Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
2,137 m	Rural dwelling primary view	Moderate	High	High	35	High	High

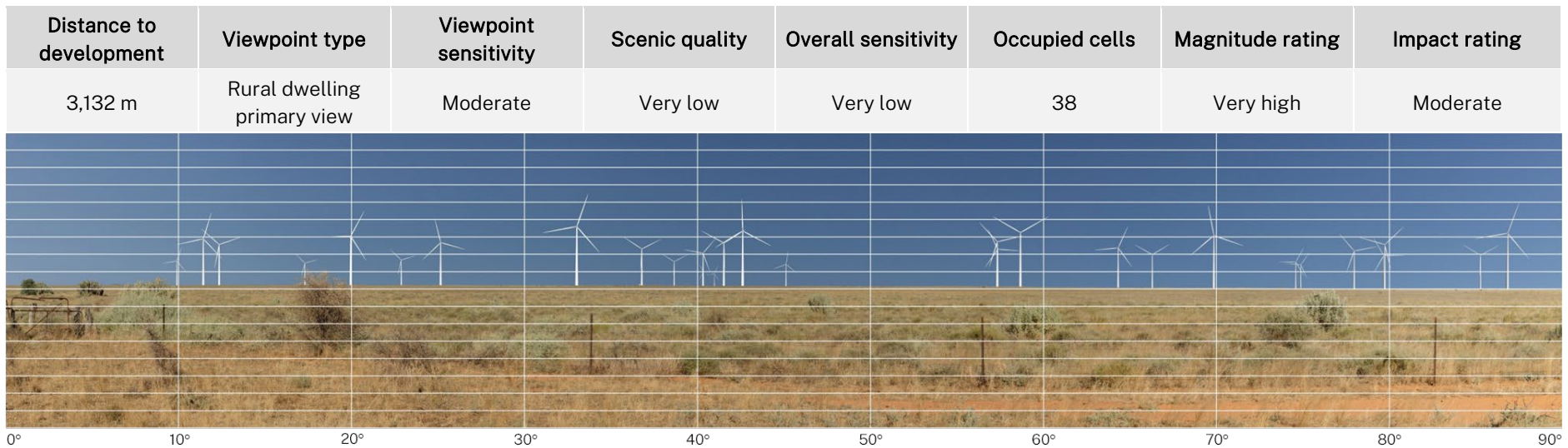
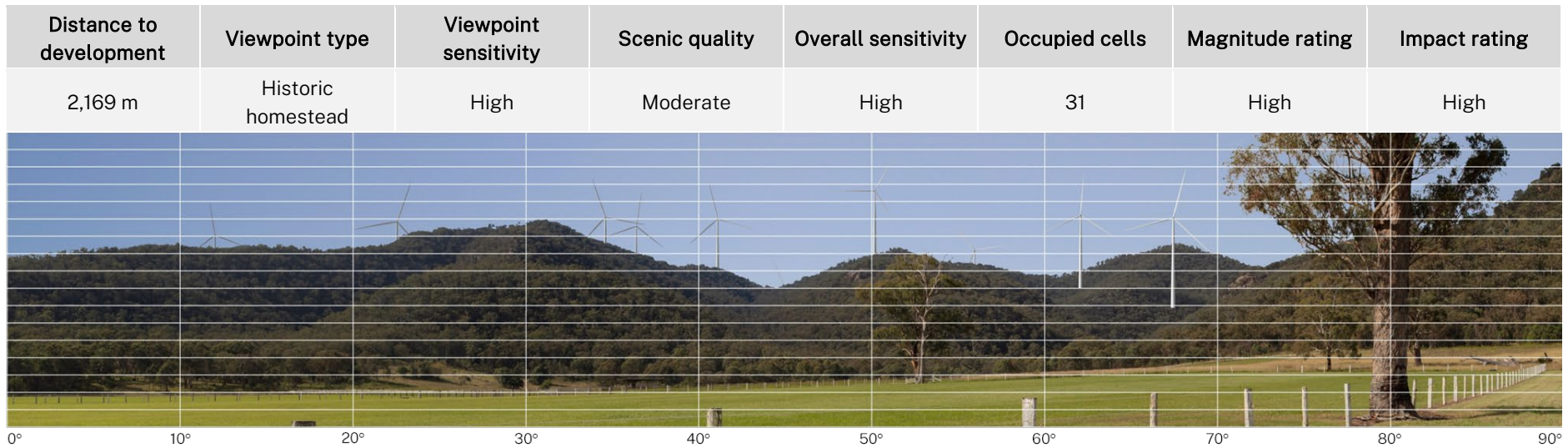


Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
1,960 m	Rural dwelling primary view	Moderate	Low	Moderate	59	Very high	High

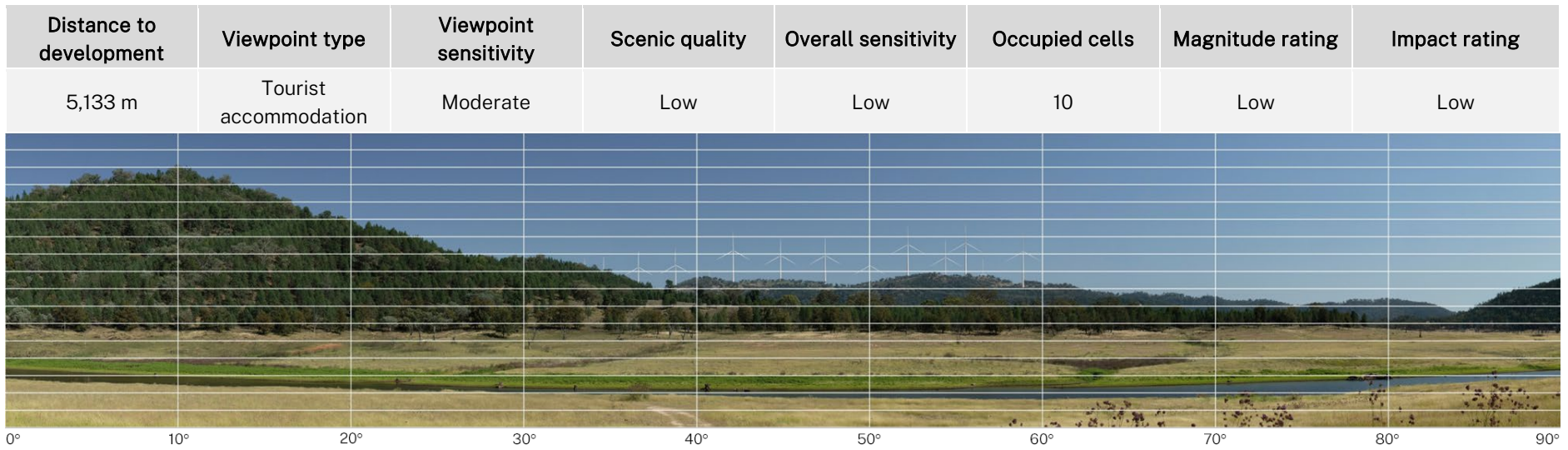
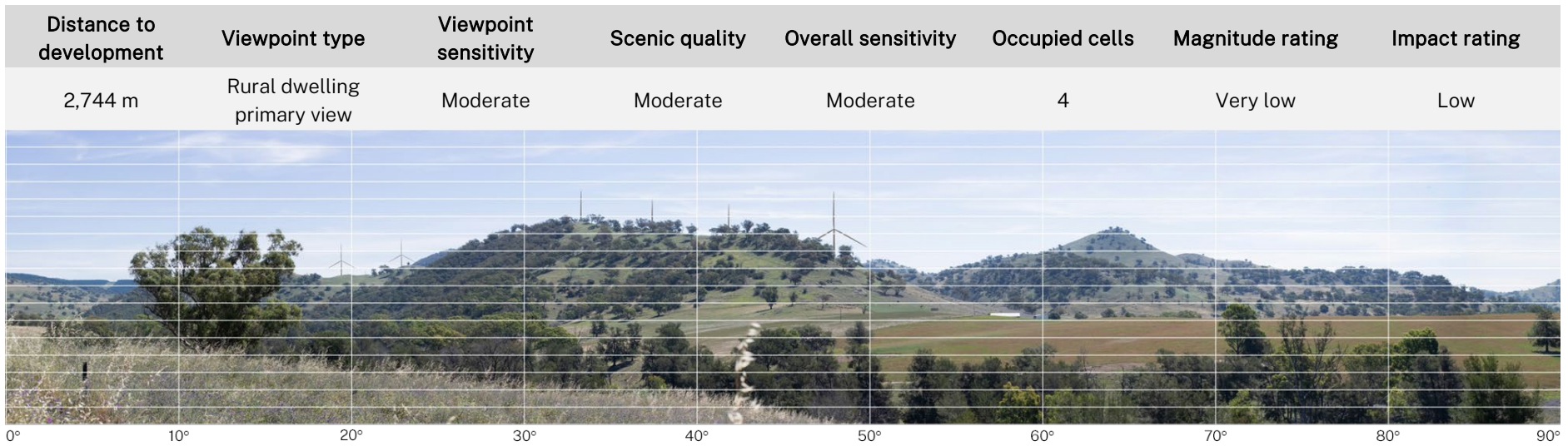




Appendix C: Visual impact examples



Appendix C: Visual impact examples





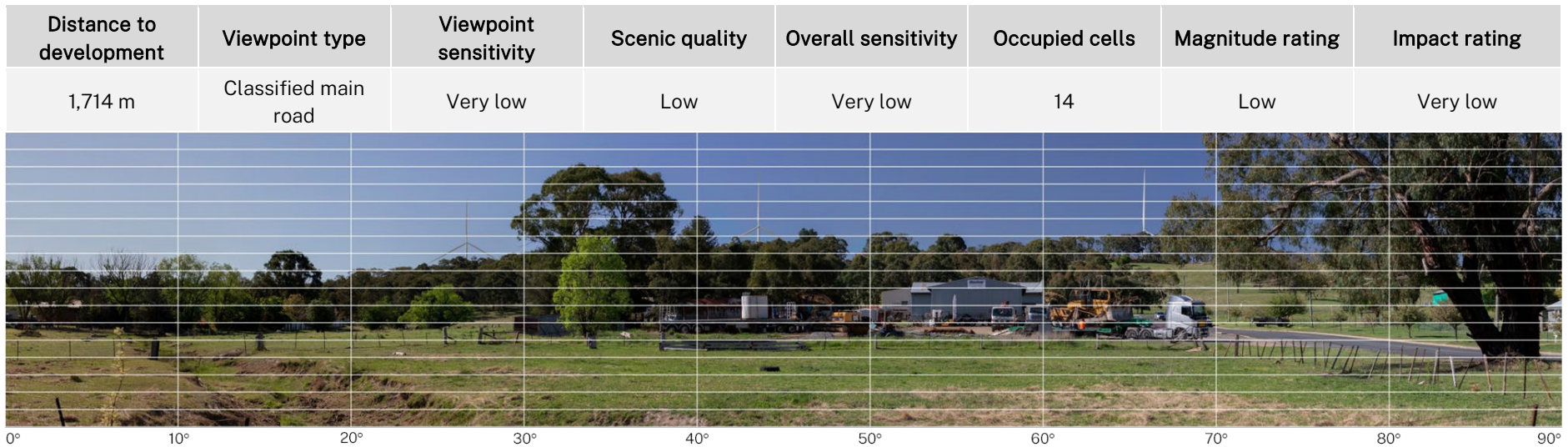
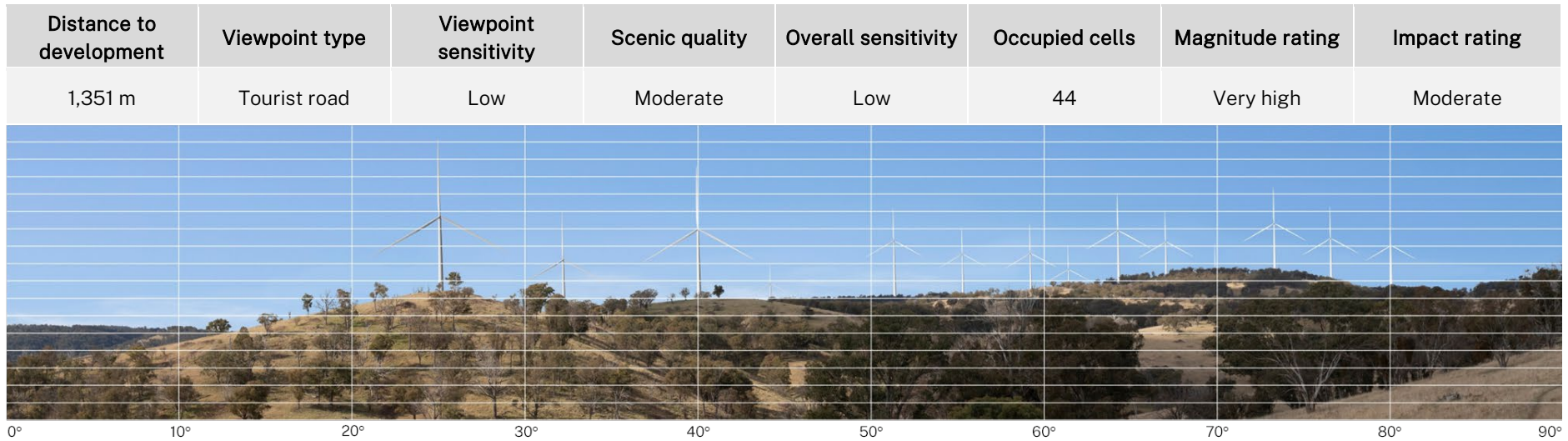
Appendix C: Visual impact examples

Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
3,043 m	Rural dwelling secondary view	Low	Low	Low	5	Very low	Very low

Public viewpoints

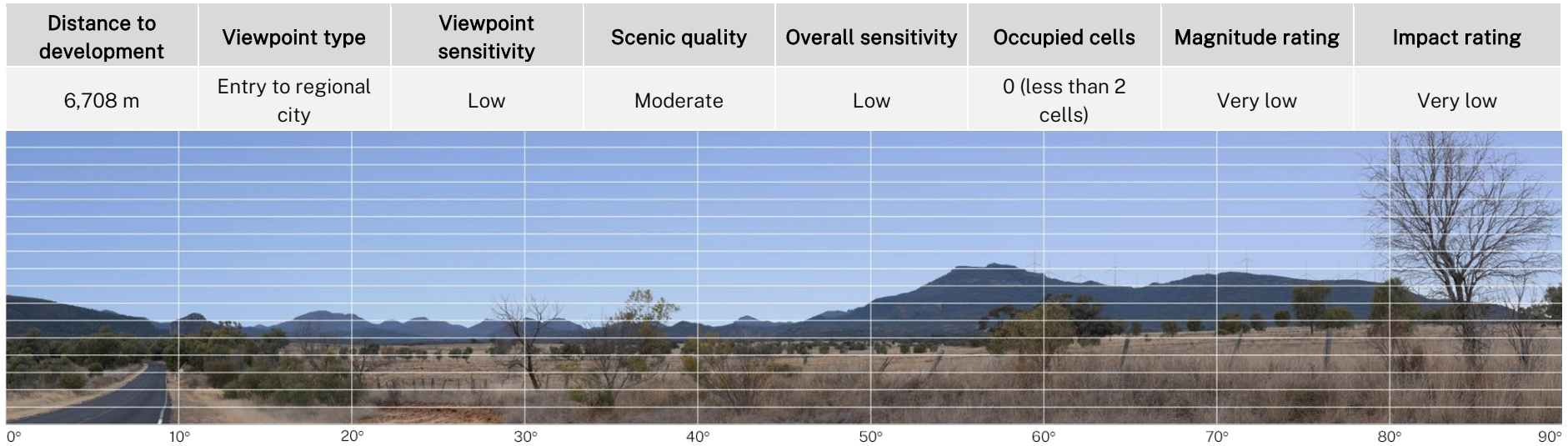
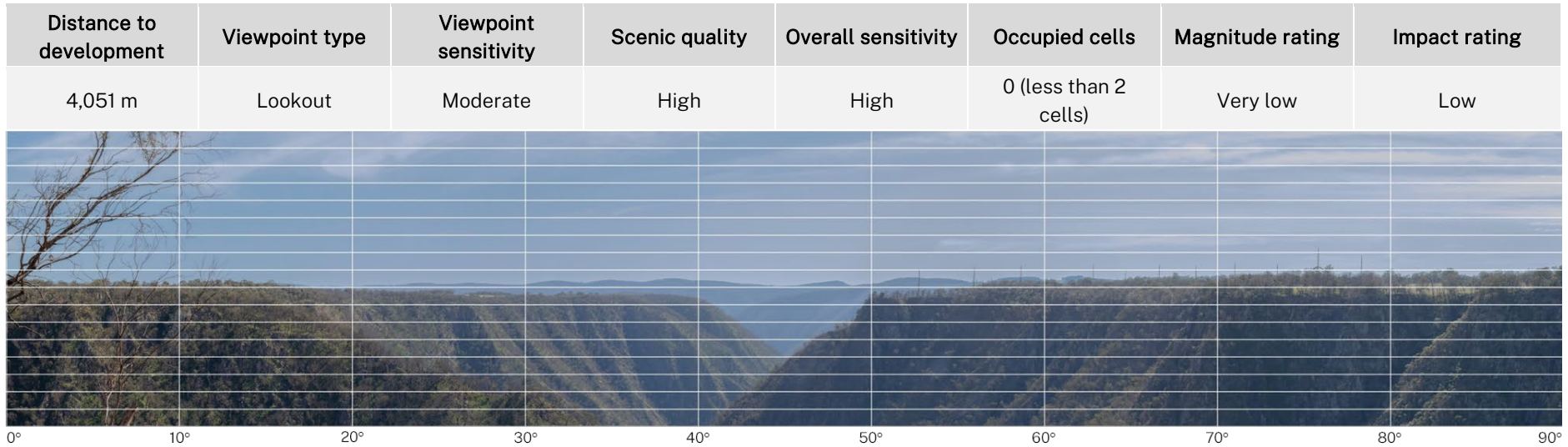
Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
2,134 m	State highway	Very low	Low	Very low	52	Very high	Moderate

Appendix C: Visual impact examples





Appendix C: Visual impact examples



Appendix C: Visual impact examples

Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
3,355 m	State highway	Very low	Very low	Very low	11	Low	Very low

Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
10,157 m	Classified main road	Very low	Very low	Very low	0 (less than 2 cells)	Very low	Very low



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# Appendix

# D

## Photomontage requirements, land access and alternatives



## Photomontages

Panoramic photographs must be constructed by merging a series of photographs to form one image with a horizontal field of view of 180 degrees. To ensure consistency and accuracy, these montages must be prepared in accordance with the requirements below.

If applicants are unable to take a photograph from a viewpoint and cannot choose an appropriate representative viewpoint, they may capture other photography to show the characteristics of the view and landscape. However, applicants should make all reasonable efforts to take representative panoramic photos to ensure assessment is as accurate as possible.

Parameter	Requirement
Camera	<ul style="list-style-type: none"> <li>• Full frame sensor</li> <li>• Camera positioned 1.5 m above the ground</li> <li>• Use of tripod (with levelling tools) and panoramic head</li> </ul>
Lens	<ul style="list-style-type: none"> <li>• 50 mm focal length</li> <li>• Aperture set to ensure all elements of the photograph are in focus</li> </ul>
Composition	<ul style="list-style-type: none"> <li>• Horizon positioned at the midpoint of the photographs</li> <li>• Multiple photographs taken every 15 degrees or at such frequency to provide adequate overlap (approximately 30%) between images</li> </ul>
Location and conditions	<ul style="list-style-type: none"> <li>• Where possible, photographs should be taken with no or minimal cloud cover and when the sun is high in the sky (generally from 9 am to 3 pm)</li> <li>• Clear skies should be superimposed over any imagery that would otherwise contain overcast skies</li> </ul>
Merging photographs	<ul style="list-style-type: none"> <li>• Photographs merged to achieve a panoramic photograph with horizontal field of view of 180 degrees</li> <li>• Merged panoramic photographs avoid distortion or warping of the individual images</li> </ul>

## Land access

Applicants generally require access to private property to prepare photomontages and make a detailed assessment of the primary and secondary views from rural dwellings. This generally involves taking photographs from locations outside any dwelling.

All landholders have a right to grant or refuse access to their property for this purpose. The Department of Planning, Housing and Infrastructure encourages all landholders to participate in this

process, as it allows for a detailed understanding of the likely impacts of the proposed development. It also allows applicants to identify strategies to minimise impacts if required.

Providing consent for land access does not indicate endorsement of the project but will help ensure a comprehensive assessment of the potential impacts. If landowners do not grant access or restrict it in a manner that prevents applicants from conducting a detailed visual impact assessment, applicants will have to conduct alternative assessments. If landowners deny access or do not engage with the applicants or their consultants, then they may lose their ability to request a photomontage later.

Applicants should make their best efforts to get permission to access and assess visual impacts from private receiver viewpoints by following the guidance below. They should coordinate this with other environmental assessment activities to minimise consultation fatigue and interruptions to property owners or tenants.

Applicants should start by making written requests to landholders to request property access. These requests should include the following:

- a formal request for permission to enter the property, including a consent form
- the reasons they require private property access (for example, to conduct the detailed visual impact assessment)
- the types of activities that will take place during access and the estimated duration of access
- a 28-day timeframe for providing a response to the written request (excluding public and school holidays)
- contact details for the landholder to discuss access requirements and procedures and to provide a response.

Applicants should follow up with the landholder within this 28-day period to ensure the landholder received the request, understands the nature of and reasons for the request, and to answer any questions the landowner may have. Applicants should follow up in person, by phone and, as a last resort, with another letter.

If the landholder has not granted land access or made contact following this process and period, applicants may proceed to alternative methods of impact assessment. Examples of alternative methods are available below.

Where a landholder has provided consent, applicants should contact the landholder with dates and times they would require access, providing multiple options where possible. Sometimes weather conditions may impact planned property access, and applicants should make alternative arrangements in these circumstances.

If the landowner cannot accommodate access during the proposed times, applicants should provide alternative options and work with the landholder to find a suitable time within 28 days. If the



landholder has not provided a reasonable option for access after this time, applicants may proceed to alternative methods of impact assessment.

Any use of drones to capture imagery for the visual impact assessment must be in accordance with the relevant laws and the Australian Government's [Drone Privacy Guideline](#).

## Photomontage alternatives

Although photomontages are the preferred tool for communicating the potential magnitude and overall impact to visual amenity, access to get the photographic elements can sometimes be intermittent or unachievable.

Applicants should make their best efforts to get permission to access private property for preparing photomontages. However, if the property owner denies or restricts access or is unreachable, applicants and their consultants may use one of the following alternatives:

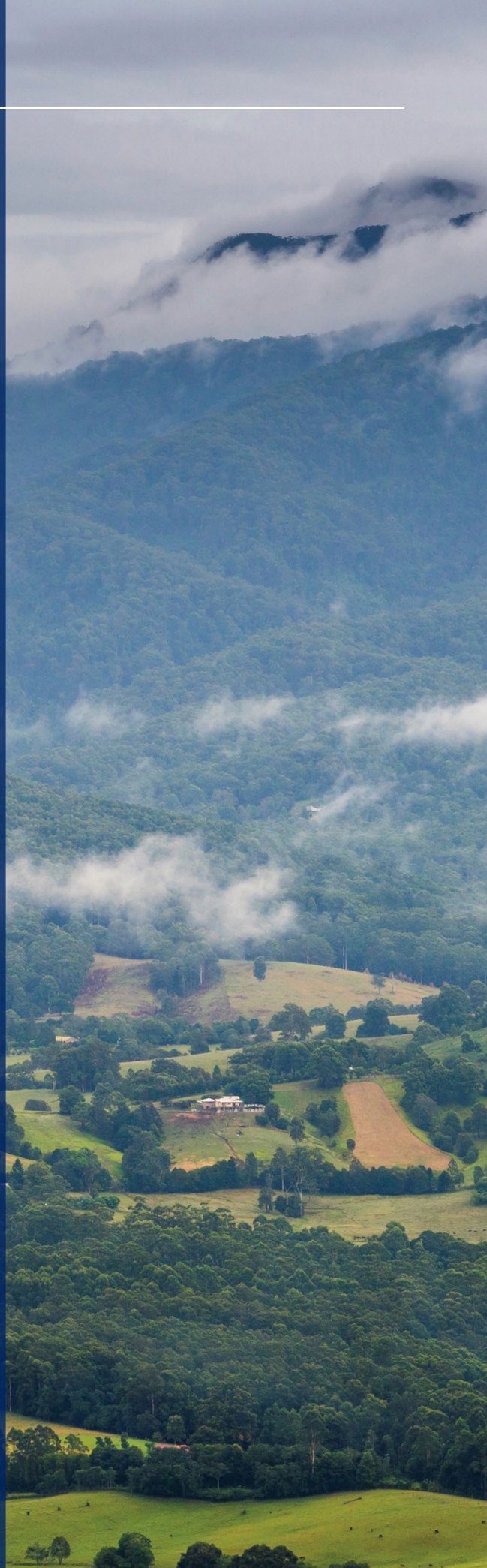
- select another viewpoint near the view location that is representative of the view and use the resulting imagery to prepare a montage
- use LiDAR and 3D modelling to clearly communicate the location and density of screening elements in the viewshed from the viewpoint
- rely on wireframes and reasonable assumptions about vegetation or other built elements in the viewshed that could screen the project; where applicants use this option, they should provide as much supporting evidence as possible.

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# Appendix

# E

## Imagery requirements



Applicants should present the visual impact assessment according to the requirements in the table below and generally according to the following examples.

Table 9. Visual impact assessment requirements

Assessment component	Requirements
<b>Viewpoint information and imagery</b>	<ul style="list-style-type: none"> <li>• Reference to the viewpoint name/number</li> <li>• Baseline panoramic image (using requirements in Appendix D)</li> <li>• Viewpoint location and GPS coordinates</li> <li>• Distance to the development</li> <li>• Direction of view towards the project</li> <li>• Identification of any turbine, including partially visible turbines, within the setback from a sensitive viewpoint</li> <li>• Numeric identification of wind turbines consistent with information in the environmental impact statement</li> <li>• Identification of any wind turbines from other visible proposed or approved wind energy developments</li> <li>• Identification of any turbines subject to an agreement with a host or neighbouring landholder</li> </ul>
<b>Sensitivity analysis</b>	<ul style="list-style-type: none"> <li>• Identification of viewpoint type</li> <li>• Identification of viewpoint sensitivity (see Table 2)</li> <li>• Identification of scenic quality (see Table 4 and Table 5)</li> <li>• Overall sensitivity (using Table 6)</li> <li>• Relevant commentary on how the scenic quality has been derived</li> </ul>
<b>Magnitude analysis</b>	<ul style="list-style-type: none"> <li>• Identification of the number of cells the project would occupy</li> <li>• Identification of the magnitude rating (using Table 1)</li> </ul>
<b>Visual impact rating</b>	<ul style="list-style-type: none"> <li>• Identification of the visual impact rating (using Table 7)</li> <li>• Excerpts of the relevant photomontage (if required) displayed at a size representative of the actual view showing areas with the greatest impact</li> </ul>
<b>Performance objectives, mitigation and residual impact</b>	<ul style="list-style-type: none"> <li>• Commentary on the visual impact, including relevant performance objectives (see Table 8) and any proposed mitigation measures</li> <li>• Detailed justification for high visual impacts that cannot be avoided</li> <li>• Panoramic photomontage including proposed mitigation with and without the magnitude grid tool</li> <li>• Age of and timing for the development of vegetation used in montages</li> </ul>



## Simple assessment example

Viewpoint	Viewpoint type	Viewpoint sensitivity	Scenic quality	Landscape character zone	Potential sensitivity	Maximum vertical field of view	Maximum horizontal field of view	Maximum occupied cells	Potential magnitude	Viewpoint in setback?	Potential impact rating
1	Rural dwelling	Moderate	Moderate	Agricultural plains	Moderate	3° (3 cells)	20° (2 cells)	6 cells	Very low	No	Low
2	Rural dwelling	Moderate	Moderate	Agricultural plains	Moderate	3° (3 cells)	30° (3 cells)	9 cells	Low	No	Low
3	Rural dwelling	Moderate	Moderate	Agricultural plains	Moderate	6° (6 cells)	30° (3 cells)	18 cells	Moderate	No	Moderate
4	Rural dwelling	Moderate	Low	Agricultural plains	Low	7° (7 cells)	60° (6 cells)	42 cells	Very high	No	Moderate
5	Historic homestead	High	High	Forested escarpment	High	3° (3 cells)	120° (12 cells)	36 cells	High	No	High

## Intermediate assessment example

### VIEWPOINT 017

#### Viewpoint Location



#### Potential Sensitivity

Viewpoint Type	Rural Dwelling
Viewpoint Sensitivity	Moderate
Scenic Quality	Low
Landscape Character Zone	Agricultural Plains
Overall Potential Sensitivity	Moderate

#### Magnitude

Occupied cells	33 cells
Magnitude	High

#### Scenic Quality Discussion

The surrounding area contains sparse and inconsistent patches of native and exotic vegetation. Pastoral elements dominate the view, and there is a high degree of human presence.

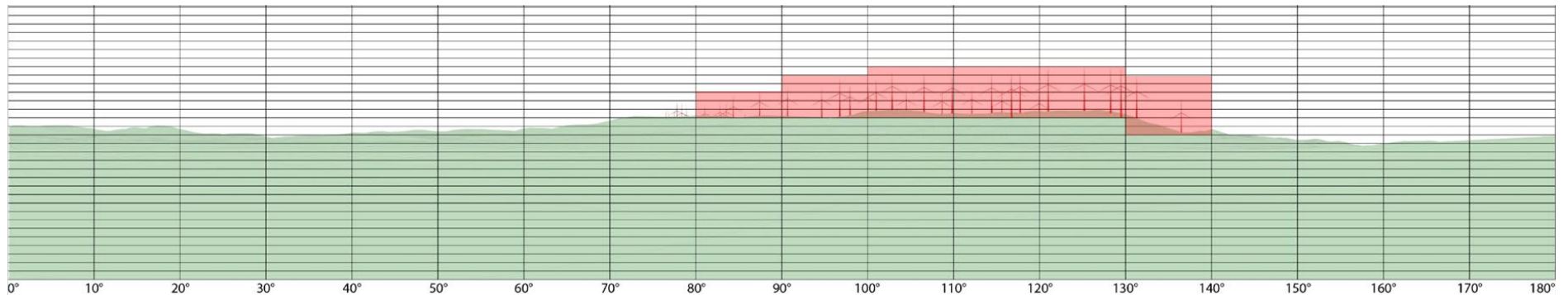
While some farm dams are present in the view, there are no significant waterbodies. There are also no unique or prominent landscape features such as ridgelines or gorges within the view and the landscape is typical of the broader region.

The landscape assessment also confirms that there are no remarkable landscape values within the LCA. As a result of this analysis, the scenic quality is considered low.

#### Impact Rating

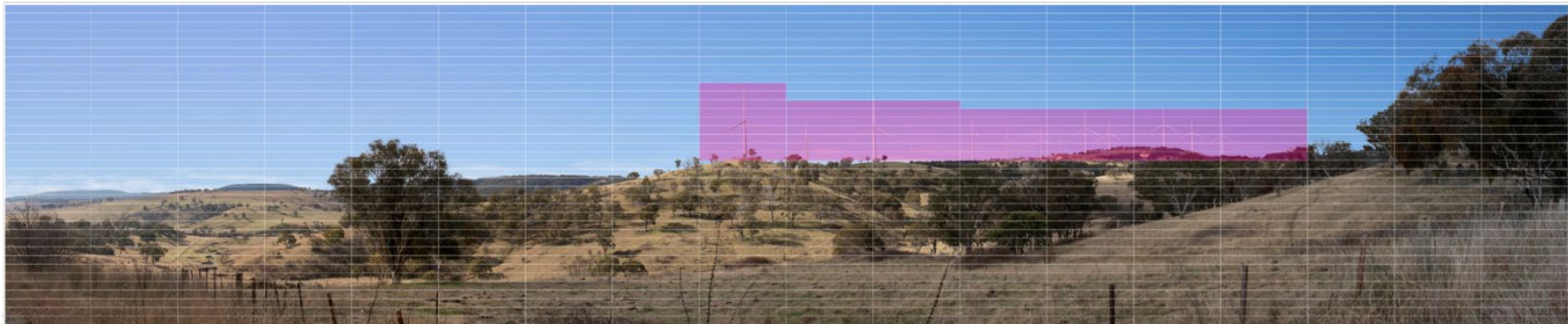
Viewpoint in setback?	No
Impact Rating	High

#### Wireframe



## Detailed assessment example

### VIEWPOINT 074



0° 10° 20° 30° 40° 50° 60° 70° 80° 90° 100° 110° 120° 130° 140° 150° 160° 170° 180°

#### Scenic Quality Discussion

The surrounding area contains sporadic native vegetation across foothills and undulating land. Some pastoral elements are evident. However, human presence is not a dominant feature of the view. The view includes distant forested ridgelines that are valued as a landscape feature. No significant waterbodies are present. The scenic quality is considered moderate.

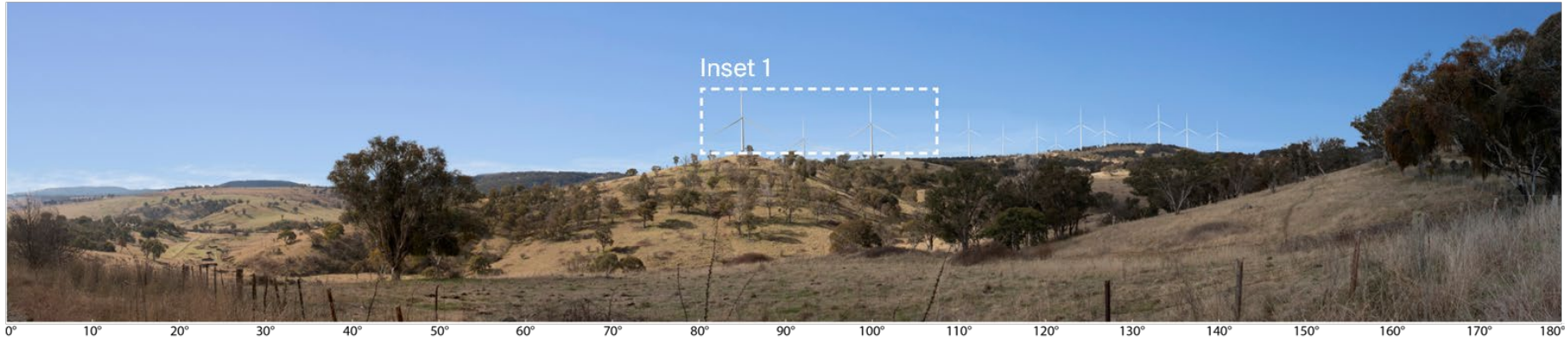


Distance to project	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
450 m	Rural dwelling (primary)	Moderate	Moderate	Moderate	43	Very high	High



## VIEWPOINT 074

Visual Impact Rating: High



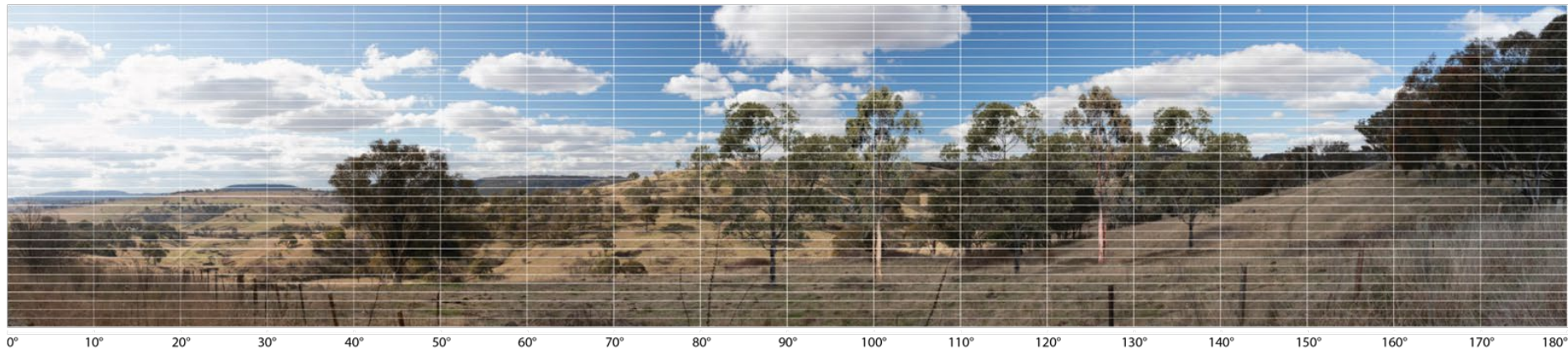
**Inset 1** (cropped 50mm image)



The inset image provides an accurate representation of the view when you view the document online, at 100% zoom, and at arm's length from the screen.

## VIEWPOINT 074

### Mitigation – Vegetation Screening at 5 years



### Mitigation and Residual Impact Discussion

Turbines 16 and 23 have been removed from the proposed design to reduce the impact. Vegetation screening is also proposed to mitigate the impact. It would be comprised of native and drought tolerant eucalypts endemic to the region. After five years, these trees will effectively screen a large portion of the project. This screening will not interrupt sight lines to the important distant ridge lines to the left in the above image. Overall, the residual impact is expected to be low.



## VIEWPOINT 074

**Mitigation** –Vegetation screening at 5 years

**Inset 2** (cropped 50mm image)



The inset image provides an accurate representation of the view when you view the document online, at 100% zoom, and at arm's length from the screen.